

CROSSTALK

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From the Sponsor

Are Your Communications Skills Advancing?



Since humans first walked the earth, we have had a continuing and unending desire to communicate and interact. Early cave dwellers used simple grunting, then developed crude cave paintings to convey thoughts and events. The Roman Empire developed a massive road system, a type of communications system, which had a major impact on cultural development and commerce. In 1436, German inventor Johannes Gutenberg developed the printing press, revolutionizing human communications. In the 20th century, mass production of paper news media became commonplace, silent pictures led to talking pictures, and radio and telephone connected people instantaneously. By the 1990s, personal computers and the Internet became the most significant communications medium in human development history. Today, we communicate and transfer knowledge all over the world in a matter of seconds through fiber optic networks, satellite communications, software, and wireless networks. Who knows what the future holds?

Regardless, human communication boils down to basic interaction between people: transmitting and receiving a message, which is incredibly complex. Many influences come into play. Did the speaker use the correct words? Did the listener understand the words? What were the tones and inflection used for emphasis, and what was the person's body language? And if communicating in writing, we remove the added dimensions of extra words: tone, inflection, and body language. An effective communicator must craft and polish his or her communications skills over time.

The question is, how well are we communicating, and are we perfecting our skills daily? I hope we can all improve our communications skills by studying this month's theme articles. Doing so, maybe we can move a few steps farther away from using grunting and crude painting of symbology on the walls in our day-to-day interactions with each other.

Bob Zwitch

Warner Robins Air Logistics Center Co-Sponsor



From the Publisher

Communications: Continuous Improvement Required



All of our readers can relate to this month's theme: communication. We communicate in all facets of our lives with workplace communications bringing some of our biggest challenges. We are very careful in what we say or don't say. We can be quick to blame customers on bad requirements or communicate poorly when defending project slips, cost overruns, or defects in our work. Communication is a skill that requires continuous improvement. I strive to communicate with trust, honesty, integrity, and sincerity, and to listen openly. The ever-changing dynamics of project work, though, make this easier said than done. Fortunately, I am part of a staff that communicates effectively; I know firsthand how this can bond a team together and help them prosper in a safe and comfortable work environment. An effective team producing a quality product is the best result of all.

This month's issue focuses on improving communication skills among team members. It is filled with excellent advice and lessons learned from implementing project charters, to understanding change management, to creating safe and productive meeting and work environments, to improving communications through process tools, to improving e-mail communications.

Also, we are busy preparing for another year at CROSSTALK. Please note our 2006 co-sponsor team lineup (see page 4) and CROSSTALK Editorial Board (see page 5). A special thanks to everyone behind the scenes who helps with CROSSTALK's continuing journey as an informational and educational source for systems and software professionals. I hope your year is off to a great start.

Tracy Stauder
Publisher



Announcing CROSSTALK's Co-Sponsor Team for 2006

Tracy Stauder
CROSSTALK

I am excited and pleased to announce the five co-sponsors of CROSSTALK, The Journal of Defense Software Engineering for 2006. The U.S. Department of Homeland Security and the Naval Air Systems Command have joined with our former 2005 co-sponsors, the three U.S. Air Force Air Logistics Centers' Software Maintenance Groups, to become the CROSSTALK Co-Sponsor Team for 2006. On behalf of our readers and staff, I welcome our new co-sponsors and offer a special thanks to our former co-sponsors for their continued support. Co-sponsor team members are identified below with a description of their organization. Look for their contributions each month in our From the Sponsor column found on page 3. Their organizations will also be highlighted on the back cover of each CROSSTALK.



Kevin Stamey, 76 SMXG Director

The 76th Software Maintenance Group at the Oklahoma City-Air Logistics Center is a leader in the avionics software industry that understands the importance of total system integration. The center has a proven track record of producing software on time, on budget, and defect-free. Its staff of software professionals and industry partners provides the expertise, software, weapons, interface, and aircraft systems that are fully integrated to ensure dependable war-winning capabilities. The center's areas of expertise include navigation, radar, weapons and system integration, systems engineering, operational flight software, automatic test equipment, and more. See <www.bringittotinker.com> for more information.



Randy Hill, 309 SMXG Director

The 309th Software Maintenance Group at the Ogden-Air Logistics Center is a recognized world leader in cradle-to-grave systems support, encompassing hardware engineering, software engineering, systems engineering, data management, consulting, and much more. The division is a Software Engineering Institute Software Capability Maturity Model® (CMM®) Level 5 Organization with Team Software ProcessSM engineers. Currently the division is transitioning to CMM IntegrationSM, which integrates systems engineering practices with software engineering processes. This model more closely matches the complex hardware, software, and systems products and capabilities representative of the organization's breadth of products and services. See <www.mas.hill.af.mil> for more information.



Bob Zwitch, 402 SMXG Deputy Director

The 402d Software Maintenance Group at the Warner Robins-Air Logistics Center provides combat-ready weapon systems, equipment, services, and support personnel for the U.S. Air Force. The center is a leader in systems engineering; reliability, maintainability, and availability engineering; safety engineering; human factors engineering;

advanced design and manufacturing engineering; and logistics engineering support. The center has worldwide management and engineering responsibility for the repair, modification and overhaul of the F-15 Eagle, C-130 Hercules, C-141 Starlifter, C-5 cargo aircraft, U-2 surveillance aircraft, all Air Force missiles, all Air Force helicopters, and more. See <[https://www.mil.robins.af.mil](http://www.mil.robins.af.mil)> for more information.



Joe Jarzombek, Department of Homeland Security – Director of Software Assurance

The Department of Homeland Security (DHS) National Cyber Security Division serves as a focal point for software assurance, as part of ensuring the security of cyberspace, and works closely with the private sector, academia, other government agencies, and international allies to improve software development and acquisition processes that will lead to better quality and more secure software. DHS provides the public-private framework for shifting the paradigm from patch management to software assurance. For more information see <www.us-cert.gov> and <[https://buildsecurityin.us-cert.gov/portal](http://buildsecurityin.us-cert.gov/portal)>.



Terry Clark, NAVAIR, Systems Engineering Department – Director, Software Engineering

The Naval Air Systems Command (NAVAIR) provides the cost-wise readiness and dominant maritime combat power to make a great Navy/Marine Corps team better. NAVAIR balances current and future readiness to ensure that naval aviators are provided with the right products to fight the global war on terrorism and other potential future conflicts. The NAVAIR team, in partnership with industry, is committed to serving the nation and the Navy by developing, acquiring, and supporting naval aeronautical and related technology systems with which the operating forces, in support of the unified commanders and our allies, can train, fight, and win. See <www.navair.navy.mil> for more information.♦

For more information about CROSSTALK co-sponsorship or for more information on how to become a co-sponsor, please contact Tracy Stauder at (801) 775-5746 or <tracy.stauder@hill.af.mil>.

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The 2006 CROSSTALK Editorial Board

Tracy Stauder
CROSSTALK

CROSSTALK proudly presents its 2006 CROSSTALK Editorial Board. Two technical reviewers, in addition to both the publisher and associate publisher, review each article submitted to CROSSTALK. Most reviewers on the list below have graciously offered their own time to support CROSSTALK's technical review process. We give a very special thanks to all those participating on our 2006 CROSSTALK Editorial Board.

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The Project Charter – Blueprint for Success

Chuck McKeever
GCI, Inc.

Projects are tricky, that is why many fail; however, a good project charter is a valid solution to help your team and organization deliver projects successfully.

According to Plato, “The beginning is the most important part of the work.” On April 30, 1492, King Ferdinand and Queen Elizabeth of Castile, Spain, issued a charter and provided Christopher Columbus with the necessary vessels and men to discover and subdue islands and a continent. The expedition charter was the realization of Columbus’ dream; after many years of work, he convinced the monarchy of the benefits of the project, and they sponsored his endeavor with resources. Additionally, based on the potential danger, they agreed to reward him after the successful conquest with a promotion to admiral and governor. This historic project charter resulted in the discovery of America and remarkable riches for the project sponsors, project manager, and Spain.

Unfortunately, this project success story is the exception, not the norm. Based on many research studies and public project failures, many projects fail due to a variety of reasons such as poor definition, poor planning, lack of commitment, etc., causing organizations to lose billions of dollars, customers, and time.

In 1994, the Standish Group, a project management and information technology company, published its landmark, original “Chaos Report” [1] finding that American companies wasted \$81 billion on canceled information technology projects. In its 2001 updated research, the Standish Group found that executive support is the most critical factor to project success. Companies that practiced senior management support of projects were more likely to achieve positive results and reduce problems throughout the project life cycle. Additionally, projects that did not have proper sponsorship – but were still continued – delivered such poor functionality that most users would not count them as successful projects.

One recent, high-profile failure is the Federal Bureau of Investigation’s (FBI) Virtual Case File (VCF) project that wasted more than \$170 million of taxpayer money; it is beset with cost, schedule, and technical problems, and is still not fielded. VCF is the case management system com-

ponent of the FBI’s information technology upgrade program known as Trilogy. In February 2005, the Department of Justice Office of the Inspector General found that “FBI management did not exercise adequate control over the Trilogy project and its evolution in the early years of the project” [2]. Despite good intentions, the lack of proper project management controls and processes doomed this effort. Unfortunately, the FBI and numerous other companies and organizations make similar errors in problem initiation, which results in wasting precious resources and not achieving organizational goals.

***“The project charter
is a stakeholders’
agreement, providing
the written
authorization to proceed
with a project.”***

This article describes a proven solution that improves project success through better communication, defined roles, and confirmed stakeholder buy-in before a project starts. The solution is a project charter. A charter is a tool that obtains commitment from all affected groups and individuals associated with a project.

The *American Heritage Dictionary* describes a charter as “any written instrument given as evidence of agreement, transfer, or contract” [3]. The word charter originated from the Latin word, chartula, which meant paper. I define a project charter as a written agreement developed and coordinated by the customer organization, the organization providing the service or product, and other key stakeholders. A charter authorizes a project, and ensures that necessary resources and management commitments are provided

to achieve success. It is a tool to obtain commitment and ensure understanding of roles and responsibilities from all affected groups for a project before it starts. A project charter is a formal agreement that ensures project stakeholders share a common understanding of why the project is being done, the timeframe, deliverables, boundaries, and responsibilities. The project charter addresses the following:

- Roles, responsibilities, activities.
- Project management framework.
- Management commitments.
- Stakeholders and partners.
- Customer success criteria.

The project charter provides a consolidated and summary-level overview of the project. It allows all stakeholders to agree on and document project scope, objectives, timeframe approach, and deliverables. The project charter is one of the first steps in the project planning process following completion of the project initiation phase. The project charter should not be confused with the investment business case (IBC). The IBC should already be completed, and the investment decision to proceed with a project should be taken before a project charter.

A project charter is also not a project plan. A project plan is more detailed and comes later in the project cycle. The project plan is a comprehensive plan that pulls together all the outputs of project planning activities, which include project scope, project activities, activity sequence, activity durations, resources required for activities, project schedule, cost estimation, spending plan, and a quality plan.

The project charter is an effective planning tool used in the project initiation phase and is a communication tool that can be continually referenced. It is both a quick reference guide and an executive summary of what the project is about, why it is being done, who is involved, roles and responsibilities, schedule, and general approach. It also helps new project team members get familiarized with the project more quickly – all in one convenient document.

The project charter does not normally change through the project life cycle. It is

created at the beginning of the effort, approved by key stakeholders, and signed before work starts on a project. Many smart organizations have implemented a no-charter, no-project policy to improve efficiency and ensure management commitment. The project charter captures the rationale and agreement for the project at the time of initiation, providing a baseline with a specific date, signatures, and formal organizational sponsorship.

The project charter is a single reference about the project regarding planning and initiation. Of course, the project charter could be updated later in the project cycle if all parties agree to new updates. However, its primary purpose is project authorization and kickoff. It provides information about scope, objectives, deliverables, risks, and other issues. It lays the foundation for how the project will be structured and managed in terms of change control, oversight risk, and issue resolution.

The Project Management Institute (PMI) has created a reference guide called “A Guide to the Project Management Body of Knowledge (PMBOK Guide)” [4] that provides generally accepted knowledge and practices used in the project management profession. The PMBOK describes the project charter as “a document that formally authorizes a project.” The project charter addresses important aspects of a project, and can be linked to all nine knowledge areas that are listed in the PMBOK. PMI recognizes the importance and utility of the project charter and considers it a best practice.

Benefits

The project charter provides a consolidated and summary-level overview of the project. It allows all stakeholders to agree on and document project scope, objectives, approach timeframe, and deliverables. Collaboration and consensus by all key project participants is the goal. It also captures the agreed-upon communications plan, control mechanisms, funding, and responsibilities of team members. It is the fundamental communications tool within the project environment. The project charter is a stakeholders’ agreement, providing the written authorization to proceed with a project. It provides a historical record that can ensure unity of effort and defuse conflict.

Leading organizations and seasoned project managers know the power of a well-written project charter. For example, in a heated discussion during a project’s monthly status review, I was once challenged as the project manager by an exec-

utive on the availability of engineering staff to support a \$4 million campus fiber optic cable installation project. Instead of reacting to the harangue, I responded to the inquiry calmly by simply showing the project charter and pointing out where his director of engineering had agreed to provide the necessary trained installers and equipment to support the schedule. Reluctantly, the executive agreed that his organization was responsible for this work and would accomplish the task on schedule. My boss, the chief information officer, was also at the meeting, and was a project stakeholder. He smiled at me knowing that we had done our homework by getting the necessary signatures on the project charter. This diffused a potential political turf battle. The project charter helped our team complete our project on time, on budget, and to specification, greatly enhancing our automation network and bandwidth service to more than 2,000 users.

A project charter provides the additional following benefits:

- Defined roles and responsibilities.
- Better project sponsorship.
- Senior management commitment.
- Improved project management processes.
- Increased probability of project success.

The development of the project charter is a collaborative activity; any one party should not do it in isolation since it outlines an agreement between the project stakeholders of what the project will deliver and how. The project manager has ultimate responsibility for ensuring the project charter is developed, coordinated, and approved. Project charters can have different formats, levels of detail, and sections. The time it takes to prepare a project charter depends on the organization, specifics included in the document, and internal procedures. It requires time to create; the time invested up front will save lots of time and reduce confusion later due to improved coordination and communication. Each organization and project manager can tailor the charter to describe and fit the project as appropriate. Based on experience and research, I recommend the following 14 areas be addressed in a project charter:

1. Project Name

The project name identifies the unique project.

2. Project Purpose

The project purpose is a brief executive summary description of the project

describing the reason for the project, background, intent, and expectations. The purpose describes the business or organizational need for the project. The following example of a project purpose describes the organizational rationale for starting a project:

Internet electronic commerce, *e-commerce*, is used daily by consumers and businesses worldwide to safely buy and sell goods and services. The proposed cost savings and productivity improvements that can be achieved by e-commerce are substantial. For this reason, the E-Commerce Project is being initiated to evaluate specifically how our organization can take advantage of these benefits, and to identify infrastructure and procedures that may be required to adopt this technology. This six-month project will result in a better understanding by our organization of the benefits and requirements for operating in an electronic commerce environment.

3. Project Scope

The project scope identifies the boundaries for the project and the product or service that will be provided. The project scope identifies what work will be performed and clearly identifies what is in scope and what is not in scope.

4. Project Objectives

Project objectives identify what the project is intended to achieve in business and technical terms, including the benefits and efficiencies to be gained. Areas that project objectives might address include operational improvements, enhanced readiness, productivity improvements, market opportunities, etc. All objectives should be based on the SMART goal setting technique: SMART is a mnemonic that stands for the following:

- Specific.
- Measurable.
- Agreed.
- Realistic.
- Time constrained.

5. Roles and Responsibilities

Roles and responsibilities are specific positions within the project, which are assigned unique authorities and duties. Four roles and responsibilities that must be identified are the project sponsor, project manager, customer, and project team. There may be other roles and responsibilities such as finance, engineering, con-

tracts, etc. that may need to be considered and included based on your organizational environment.

Sponsor

The sponsor is an organizational leader who commits political capital, resources, and time in support of the project. The sponsor is normally from senior management and is often the project champion. The project sponsor maintains ultimate authority over and responsibility for the project. Ideally, the sponsor should be able to make 75 percent of the decisions without getting additional approvals from executive management. The sponsor is the arbitrator who resolves conflicts between stakeholders and organizational departments to support the project team.

Project Manager

The project manager has overall responsibility for the project's success and reports to the project sponsor. The project manager manages the project on a day-to-day basis, coordinates all activities, and approves work products. It is important to list the project manager's authority and boundaries. The project manager develops and executes the project charter and project plan.

Customer

The customer will be the beneficiary and receive the results of your project; a customer could be a person or organization. The customer representative is the voice of the customer and represents users and customers to ensure that their equities are addressed.

Project Team

The project team consists of core functional and technical team members working together to produce project deliverables and work packages. The stakeholder team consists of individuals and organizations that will be affected by the project and have a vested interest in the project's success. The stakeholder team ensures all business and technical requirements are addressed, reviews project status, provides feedback to the project team, and reviews project deliverables.

6. Project Approach

The project approach identifies the general strategy for completing the project and explains methods and processes that will be used. It describes the project team structure and outlines the project plan. A high-level project schedule with milestone dates and control gates should also be included. Identify any key interdependent-

cies, personnel, and relationships outside the control of the project team that will affect project success such as dependent architecture projects. Address how decision making will be done. Include your communications strategy, including how the project team will communicate and get the word out, i.e., meetings, e-mail, Web site, etc. If you have a tentative idea of the project completion date, include it in this section.

7. Project Deliverables

This section provides a list of all deliverables that will be generated both during and upon completion of the project, along with milestones with dates. A high-level summary of all major deliverables should also be provided. Every deliverable should provide a description of its quality objective and approval requirement. All deliverables must be specific and measurable, and there should be an ability to measure the quality of the deliverable. For example, weekly project status reports provided to the project sponsor, project team, and stakeholder team improve communication and customer satisfaction by keeping everyone informed of progress.

8. Constraints and Assumptions

Constraints and assumptions identify limitations considering the current and future environment the project must support. These factors will influence many project decisions and strategies. Dependencies outside of the project manager's control should be identified. For example, activities to be performed by a client or subcontractor required to support the project must be documented. Beware of scope creep and new requirements. As the FBI's VCF project demonstrated, an organization should not solely rely on a prime contractor for due diligence and assumptions. Unfortunately, there is often a conflict of interest. The potential impact of each constraint and assumption, both positive and negative, should be identified.

9. References

Identify any documents, decisions, or references that were used in developing the project charter. Include the date, author, and other information to describe the citation.

10. Terminology

Describe any unique terms or acronyms that will be used within the project. Terms that may be new or confusing to project stakeholders should be clearly explained.

Avoid technical jargon and buzzwords. When in doubt, spell it out.

11. Risk Management

Identify risks associated with the project and the actions that can be taken during project execution to minimize impact. Mitigation strategies and planned response approaches should also be identified. What are your contingency plans to deal with the unexpected?

12. Project Facilities and Resources

The project's requirements for funding, facilities, resources, office space, computer equipment, office equipment, unique security requirements, and support tools should be identified. As they say in Hollywood, "Show me the money." You should include your tentative budget here so the organization can plan, prioritize, and provide your project with sufficient funding for success. Other areas such as training, quality assurance, and documentation should also be considered. Responsibilities for coordination and resolution of these issues should be clearly assigned. Any service-level agreement or support arrangement should be documented.

13. Performance Measures

The project should identify its success criteria. List the agreed-upon methods for assessing whether project goals were achieved. Performance measures use measurable criteria that should be satisfied before the project is considered complete.

14. Approval

This section identifies the names and roles of all key stakeholders, including the project sponsor, project manager, the customer representative, and other key project personnel. All key stakeholders should sign and date the project charter to document the agreement, ensure buy-in, and provide written authorization for the project to begin.

Summary

A project charter is your insurance policy to get management commitment, resources, and stakeholder buy-in to ensure success. Another selling point for a project charter is that it helps executives and organizations in delegating authority and responsibility to a project manager. It encourages project managers and functional managers to work together and help resolve conflicts at the lowest organizational level since specific roles are identified early in the project life cycle. A project charter is a proven technique to

properly initiate your project in preparing for tomorrow's achievements. A project charter is an effective tool that can assist organizations and project managers with delivering projects more successfully. An anonymous proverb sums it up: "The faintest ink is more powerful than the strongest memory."♦

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WEB SITES

The Myers & Briggs Foundation

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The mission of the Myers & Briggs Foundation is to continue the pioneering work of Katharine Cook Briggs and Isabel Briggs Myers in the field of psychological type, especially the ethical and accurate use of the Myers-Briggs Type Indicator (MBTI) instrument. The purpose of the MBTI personality inventory is to make the theory of psychological types described by C.G. Jung understandable and useful in people's lives. The essence of the theory is that much seemingly random variation in behavior is actually quite orderly and consistent, being due to basic differences in the way individuals prefer to use their perception and judgment.

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The Effective Communication.org – E-mail Resource Center was developed by

Wayne McKinnon to answer many of the questions about using e-mail systems that he encounters when giving presentations throughout the world. The site explains how e-mail communication differs from other forms of communication, and how it can be used most effectively. McKinnon also offers a free newsletter of additional e-mail insights and answers.

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COMING EVENTS

February 6-9

Components for Military and Space Electronics Conference and Expo
Los Angeles, CA
www.cti-us.com/ucmsemain.htm

February 13-16

The 5th IEEE International Conference on COTS-Based Software Systems
Orlando, FL
www.iccbss.org/2006

February 14-16

The International Association of Science and Technology for Development Conference on Software Engineering
Innsbruck, Austria
www.iasted.org/conferences/2006/innsbruck/se.htm

February 15-17

5th International Conference on Electronics, Hardware, Wireless, and Optical Communications
Madrid, Spain
www.worldses.org/conferences/2006/spain/ehac/index.html

March 6-9

Software Engineering Process Group (SEPG) 2006
Nashville, TN
www.sei.cmu.edu/sepg

March 13-15

International Symposium on Secure Software Engineering
Washington, D.C.
www.jmu.edu/iiia/issse/

March 15-16

International Conference on Information Warfare and Security
Princess Anne, MD
<http://academic-conferences.org/iciw/iciw2006/iciw06-home.htm>

May 1-4

2006 Systems and Software Technology Conference



Salt Lake City, UT
www.stc-online.org

Safety Check®

Steven M. Smith¹
EMC Corporation

You have heard repeatedly that an agenda is a vital ingredient to a successful meeting. But little is ever heard about safety in meetings – the environmental variable that determines whether people participate or merely observe. How do you measure safety? What actions are available to leaders for creating a safe meeting environment?

He is wearing his traditional garb: dark suit, white button-down shirt, red tie, and black tasseled shoes. The glare off his wire-rimmed glasses makes it difficult to see those steely blue eyes. Harry Fox has all the right moves, and his quick climb up the management ladder proves it. He is arrogant and ruthless. People who oppose his ideas pay a price. And the payment is extracted when they can least afford it.

We are both participating in a problem-solving meeting. Well, that is not quite true: I am observing and Harry is talking. He just stole the floor from Jim King a few minutes ago by talking louder than Jim. I hate that behavior. Jim looks dejected. Harry continues to dictate his ideas about how the team should solve the problem. I realize that Harry missed three crucial facts, which will cause his solution to fail.

Should I share the facts? Wait a minute. Harry does not like to be corrected. He wants to hear only the facts that support his position. Harry is connected all the way to the top of the company. I am connected to the people on my team. I hesitate. Wow, that is totally uncharacteristic of me: I am known as someone who speaks his mind. I look over at Harry. He has taken his glasses off and is moving them rhythmically up and down as he talks. Although what he is saying does not make sense, it sounds authoritative. I feel my gut twisting. Is it anger? No. It's fear.

Harry concludes his speech. There is a pause. If I want to speak, it's time ... I say nothing.

Safety

The omission of crucial facts and opinions happens in thousands of business meetings every day. If people do not feel

safe, they are not going to say anything. And you will have no idea about what you missed.

Too often the participants who are the most vocal assume that everyone feels as safe as they do. This assumption is wrong more often than not. But it is rarely ever tested.

You can help increase the safety of your meetings. Collect data about conversational safety. Share it. Interpret it. And decide how to respond to it. These actions will open the opportunity to transform your meetings. For instance, you will cre-

“An unsafe environment causes participants to share fewer ideas and to carefully filter the ideas they do share to be sure they are safe.”

ate the opportunity to discuss and take action on items previously not discussable such as who was or was not invited; what is and is not on the agenda; and how the discussions will or will not be processed. I have experienced the power of this transformation many times. You can too.

Collect the Data

Inform everyone that you will use a secret ballot to poll the participants about their safety to speak freely. Poll people with the following question: “How safe is it for you to fully share your ideas during this meeting?”

Write this question on the board or a flip chart. Clarify that the ballots are not identified, just a number on a slip of paper. Expand on what *fully share* means by listing some controversial ideas that were not shared at other meetings that would have made a difference.

An unsafe environment causes participants to share fewer ideas and to carefully filter the ideas they do share to be sure they are safe. Poll people for the information in Table 1.

Pass out a ballot – a small piece of paper, Post-it Note, or note card – to each participant. Ask everyone to write the number corresponding to their level of safety on the ballot using the numbers zero through four as defined in Table 1. My experience is that some people will, regardless of the instructions, write a decimal number. Simplify things for yourself by informing everyone that all the ballots will be rounded so that the results fit the range of the gradient.

Ask them to cup the ballot in their hand when writing the number so that no other participant can see their rating. Stress to everyone that you do not want anyone to share their rating with anyone else, regardless of how safe they personally feel. Again, emphasize that only you will see their ratings. Have the participants fold the ballot in half and place it in a container, such as a hat.

Share the Data

Ask a participant to help you build a histogram of the poll. I suggest that you use a flipchart so there is a hard copy of the histogram to use when you write up the minutes of the meeting. Pull each ballot out of the container one-by-one and read the score to the person building the histogram. Stuff the recorded ballot into one of your pockets or put them in your briefcase so no one else can or will ever see them. Note that you are not only revealing how safe people feel – you are also building safety by checking numbers in a way that reinforces safety.

Table 2 shows an actual histogram

Table 1: A Safety Gradient

Level	Description	Comment
4	Secure	Everything is discussable without filtering.
3	Safe	Almost everything is discussable without filtering.
2	Neutral	Most things are discussable without filtering.
1	Dangerous	Many of my best ideas are not discussable.
0	Treacherous	Most of my best ideas are not discussable.

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built during a requirements-gathering meeting that I facilitated at a large manufacturing company.

Interpret and Respond

Ask the participants, "What is your interpretation of the histogram?" A manager in a requirements-gathering meeting said they needed to start trusting each other. His management colleagues vigorously echoed his belief. And his colleagues had a lot more to say about the importance of trusting each other. I let this discussion continue for 10 minutes and asked, "What cluster of people on the histogram do you think is offering the most advice?" The room fell silent. The people who felt the safest realized that they were doing the most talking. They realized that the people who felt threatened were not talking.

Telling people how they should feel does not work. And, in my experience, people know that as a fact, but forget to put that knowledge to work. It helps to give them a gentle reminder. Ask everyone, "How do the participants who feel completely safe help the participants who feel threatened?" The answers I have heard in meeting after meeting can be summarized in two words: care and listen.

During a manufacturing meeting, people did start to care and listen. The participants slowed down and asked each other questions. Most importantly, they were okay with moments when no one spoke. I believe that silence is a gift. It shows people that you are ready and want to listen. And, in the case of a meeting, silence demonstrates that the group is ready and wants to listen.

These changes made a big difference in the requirements meeting. The discussions were deeper. The enriched conversation enabled the discovery of requirements that would have been invisible to them. They were more effective together than they had ever been.

Other Methods

Another method that can help create safety, especially in large groups, is to let the participants build the safety guidelines for their meeting.

Split the participants into small groups. The ideal size is a triad – three participants. Ask the groups to (1) introduce themselves to each other, and (2) create a set of guidelines for conducting a safe meeting. Give them a few test cases to ponder. For instance, someone starts blaming someone else, someone tells an inappropriate joke, or someone dominates the meeting, and so on. Let everyone

Level	Description	Number of People
4	Secure	*****
3	Safe	*
2	Neutral	***
1	Dangerous	***
0	Treacherous	

Table 2: *The Histogram From an Actual Safety Check*

know that they should not limit themselves to the test cases. You want them to share any guideline that will make the meeting safer.

The hope is that the discussion will help remind people of what they already know about safety, and remind them to practice what they know. Just as importantly, the hope is that a connection with a small, manageable number of people will increase safety.

Have each small group introduce their members and share the safety guidelines they created with everyone. You will be

**"Another method that
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amazed at the wisdom that people have about safety. Gain agreement from everyone on which guidelines to accept. Remind them that the guidelines are theirs rather than yours. If someone violates a guideline, you will call them on it.

Ask the group to monitor your facilitation and to inform you if you allow any deviation from the agreed-upon guidelines. When someone mentions a deviation, treat it with the utmost care and respect. It is the ultimate demonstration of the value you put on safety.

Final Thoughts

Although the methods I discuss are especially valuable for setting the right tone for organizational improvement efforts or multi-day meetings such as a project retrospective, they are also valuable for reoccurring meetings. The key is to expose, explore, and respond to feedback about safety. If followed, the feedback will take the group in the appropriate direction.

Feelings about safety will change so it is a wise investment to have a process for periodically exposing and responding to issues about safety.

Regardless of the method used, you can never be absolutely certain that all the participants feel safe. If someone would have asked me how safe I felt during the meeting with Harry Fox, I would have voted neutral or safe so that Harry would not find out.

The best that you can do is to solicit and respect everyone's ideas. The leader who models appropriate behavior in meeting after meeting is constantly renewing and enriching safety and productivity.

Be a leader. Care. Listen. Model the behavior you want.♦

Note

1. The views expressed in this article are Smith's and do not necessarily reflect the views of EMC.

Acknowledgements

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Building Successful Software Development Teams Using TSP and Effective Communication Networks

Dr. William R. Nichols
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Social network models can help explain how and why some organizational structures and practices work. Moreover, network analysis is accessible to engineering practitioners and is particularly effective in helping us understand the value of Team Software ProcessSM (TSPSM). Networks not only offer an explanation of how TSP works with respect to communication, but also suggest that as we scale beyond a team of teams, new organizational structures will be required. The role manager structure sets TSP apart. Teams that use role managers take advantage of a proven communication pattern that scales as teams grow. Successful work is facilitated by effective communication, which can be improved with specific network structures. These structures can take shape through the self-organization of teams around TSP role managers. Unlike the traditional tree hierarchy that you see on most organizational charts, the more flexible, self-organizing network can respond quickly to the demands of a fast-paced workplace.

Every software development organization strives to build successful project teams. But almost anyone who has been part of a growing organization has seen formerly successful teams fail as coordination, communication, and decision making were impeded by increased team size.

As a Team Software ProcessSM (TSPSM) coach and team lead, I have struggled with the problems of getting the right people talking through the requirements, synchronizing schedules, and working through the problems such as design and configuration control. The time demands upon a lead in the middle of these deci-

sions become overwhelming. Fortunately, TSP encourages role managers to guide self-directed teams toward making decisions and completing work.

Role managers act as the conscience of the team within certain domains: planning, design, quality, customer interface, implementation, test, support, and process. Role managers need not *do* the associated domain tasks, but rather serve as points of contact and ensure that the work is done and done well.

Watts Humphrey [1] describes the reasons for role managers. I found that although these reasons seemed sound,

many of the team members, including myself, could not internalize this explanation. The epiphany for me came after I used a pen and notepad to sketch out the principle patterns of communication within my team and among the several teams on our project. I discovered that there is another and more compelling reason that roles are important in making TSP work.

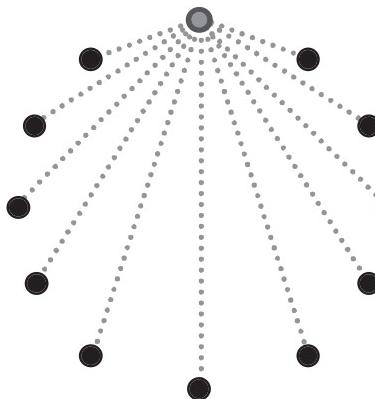
The patterns were based on subjective rather than actual measurement; nonetheless, I discovered that I could demonstrate important characteristics of our group interactions by graphically representing the paths of communication. As if it were a physical network, I sketched an idealized version of a team reliant upon its lead for passing information and making decisions, shown in Figure 1A. I represented team members as *nodes* and the communication *links* as lines joining the nodes. The hub and spoke topology formed a *star* with the team lead in the central role.

I next sketched Figure 1B to show several role managers, for example, the planning, design, and customer interface role managers assuming responsibility for these important knowledge domains. The role manager links distributed communication, thus opening new paths and reducing the communication traffic load through the team lead. Finally, I added some less-active roles to Figure 1B, (testing becomes more active late in a project, design less active) and the result was a complete network following a *web*. I reasoned that this was the team that would keep running even if one or two key members became unavailable.

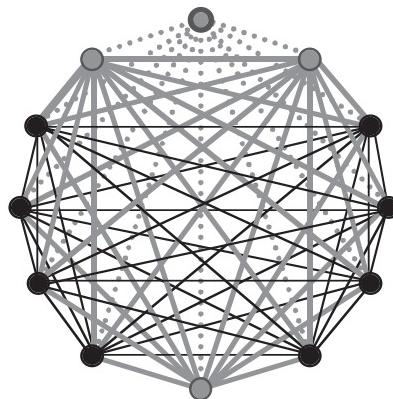
Using this graphical approach, I was able to qualitatively show, by following the Figure 1A pattern, how team leads had become overloaded. With this graphic, I

Figure 1A and 1B: Star and Web Network Technologies

- Team Lead
- Team Member (Less Active Role)
- Role Manager (Active Role)
- Communication with Team Lead
- Less Active Communication with Role Manager
- More Active Communication with Role Manager



A: Star



B: Web

SM Team Software Process and TSP are service marks of Carnegie Mellon University.

was able to show how the team leads had become bottlenecks, and how reinvigorating the role managers' activity would change the communication patterns to our benefit.

Role Managers Add Communication Links

A necessary condition for a self-directed team is that the team manages all tasks. TSP teams designate role managers to assume cognizance of important task-based information domains within the team. But the benefits of role managers extend beyond the individual team.

Multiteam TSP (TSPm) scales the practice of TSP to larger projects containing more than one team. Across the project, teams of role managers – one from each team – form *affiliation groups*, directing information for a given domain through a team knowledge node – the role manager – to the greater project, thus distributing project information traffic. Figure 2 shows three teams (clusters) communicating through multiple channels. Communication traffic is heavier within teams and lighter between teams. The primary paths of communication between teams are through team leads and role managers.

Because communication becomes more efficiently directed, there is less communication *traffic*, and nodes no longer get as many *busy signals* when seeking information. There is no strategically placed node that, when lost, would cause a catastrophic failure. Moreover, the information most commonly needed is under the cognizance of someone who knows or can gain access to that information when it is needed.

For example, a new team member may need clarification on requirements. The customer interface manager may or may not know the answer, but should know whom to ask. The power of networks is leveraged through this selective specialization, thus information becomes readily available through the network. The team leaders are still important, but they no longer stand out or create bottlenecks in the network topology. By creating role teams, we have enabled the *team of teams* to function as a *small world*. Everyone in another team is either a *friend* or a *friend of a friend*. Information flows within and among the teams with very few intermediate connections.

This has fundamentally changed the group structure and dynamic. The smaller groups, teams, and role teams can invest in social capital (spend time cultivating relationships) required to form tightly knit

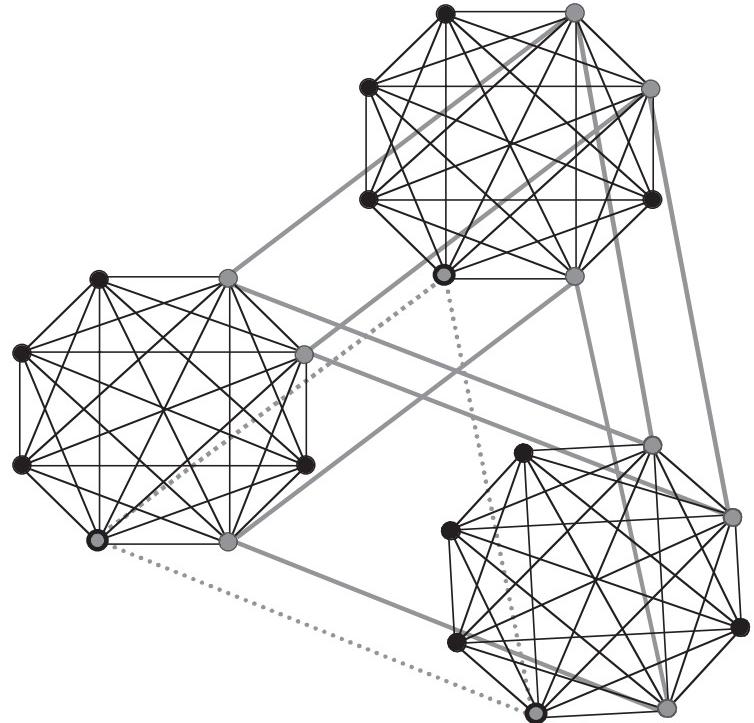


Figure 2: Three Teams (Clusters) Connected by Team Leads and Role Managers

teams. Where it is necessary to pass information between groups, we know who the *go-to guy* is. A structure has emerged that does not show up on the organizational chart.

Team and Project Size Limits

Physical networks have physical and engineering constraints. Routers, for example, can process only a limited bandwidth; transformers in an electrical grid can carry only so much current. Similarly, human networks have constraints that must be considered. It is not possible to work closely with a large number of people simultaneously. As working groups become large, communication requires more overhead.

In "The Mythical Man Month," [2] Brooks points out that there are $n(n-1)/2$ potential links, leading to an n -squared scaling with team size. A team of 15 has 50 percent more links than a team of 12, more than twice the links of a team of 10, and five times as many links as a team of seven. Time is limited, and each relationship requires time for maintenance. Because of this, it is practical to keep working groups small [3]. Some claim the *sweet spot* is around a team as small as seven

[4]. For our purposes, we will place the practical upper limit at 12, based on an observed sociological phenomenon known as an *empathy group* [5]. Larger teams can exist, but they will usually factor into sub-teams.

It may not be just the total number of potential links. Figure 1A suggests that the number of direct links any individual can support may limit team size. In Figure 1A, the team lead is the central node. The communications to other team members are represented by links (communication channels) to other nodes (team members). In Figure 1A, a star network appears to be simple and elegant, and team members communicate primarily through the lead who is a *hub* linking the nodes. Most questions are resolved by asking the lead for clarification or guidance. There is no interaction between most nodes. However, the hub creates a communication bottleneck. For example, if the person acting as the hub is out sick, no communication can take place, no guidance can be provided, and work cannot move forward. If the hub needs to manage too much communication, some will not take place. If you limit your team communication to flow through one centralized point, it rapidly

becomes less effective, and because of the bottleneck effect, team size can no longer scale.

To achieve maximum scaling within a team, encourage efficient, point-to-point communication. Distribute the communication traffic in a decentralized network. By distributing the communication traffic through many node-to-node pairs, the traffic becomes balanced and bottlenecks are eliminated. If one node is removed, others can easily replace it. The cost is the time needed to build and maintain the relationships. But the resulting *Web* network is strong and flexible; it provides ongoing, efficient communication that keeps information flowing and tasks moving forward.

Consider Figure 1B as an alternative. In this communication model, the team lead has delegated responsibility. TSP does this naturally through the role managers who assume responsibility not only for domain knowledge, but also for tracking tasks within that domain. Adding several highly active roles significantly increases the available routes for moving information between any two points. The communication traffic is distributed so that the team lead no longer stands out in the network topology.

Inclusion of the less active roles permits most sorts of information essential to project success to be communicated directly. In the language of networks, we have converted a network with average node-to-node degree of separation (the number of links that a message must traverse between two nodes) of nearly two, to one with an average degree of separation of one. This small degree of separation, along with plenty of direct communication, is another key to project success.

Degrees of Separation and Small Worlds

The degree of separation is important for the team and project because it affects the flow and accuracy of information that teams need to be successful. Noah Friedkin of the University of California at Santa Barbara has shown that the limit of observability in organizations is only about three degrees of separation [6]. This is intuitively consistent with how we may use the *friend of a friend* (two degrees of separation) to gather information or to access other parts of the organization. However, at three degrees, the view becomes cloudy; at four, it becomes opaque. This makes sense if you consider some common barriers to clear communication:

1. **Messages are imperfect.** The sender

and receiver can understand an ambiguous or vague message differently.

2. **When information is directed through a node, that node acts as a filter.** The message is filtered through that person's experience, knowledge, and priorities. Each node can change a message in subtle ways that, when added together, result in an original sender and final recipient understanding very different meanings.
3. **The technical means of communication are imperfect or incomplete.** Most communication channels include signal loss or noise. The telephone loses facial cues. E-mail loses facial and vocal inflection. Video conferencing has inconsistent sound and visual signal delays. Any of these can cause unintended interpretations of communication.

“Teams of role managers not only make the network a small world, but also serve to make the network searchable, greatly shortening the average communication path.”

The upshot is that a functioning team must be kept to an average of three or fewer degrees of separation, much like the *small world* network described by Duncan Watts and Steven Strogatz [7]. The essence of a small world is that everyone knows everyone else through a very short chain of *handshakes*. This recalls the well-known concept of *six degrees of separation* that was based on a famous experiment by Stanley Milgram [8]. Watts and Strogatz described transforming a network into a small-world network by adding only a small number of random links. Local clusters, in our case teams, are the smallest of small worlds. Their world becomes even smaller by adding a few role managers. Role managers direct information through standard and commonly understood channels. Teams of role managers not only make the network a small world, but also serve to make the network searchable, greatly shortening the average communication path. This becomes particularly important as projects and teams grow.

Scaling Up to Teams of Teams

When the project size scales up, teams must deal with the stresses that come with the increased numbers. The British anthropologist Dunbar [9, 10, 11] noted that group size tends to saturate at around 12, similar to the *empathy* group described by Buys and Larsen [5]. This saturation occurs when the necessary investment in social capital becomes too large; at that point, the groups then fission into smaller groups. Dunbar also noted that the larger social network is limited to about 150, which is due to the human capacity to recognize and track personal facts about all members of a group.

Below 150 group members, a relatively informal structure is sufficient because peer pressure and personal loyalty are adequate to maintain discipline and control. Larger groups need a formal command structure to maintain order. For example, the Hutterites, a rural North American group that practices communal living, limit each community to 150 members [12]. Throughout history, basic military battle groups, comparable to a modern army company, remained near this limit. Many working groups and businesses fail at this point as efficient communication, knowledge, and informal control structures break down. Interestingly, Dunbar noted that where groups exceeded the nominal upper bounds, it was typical that *roles* had evolved, (e.g., sheriff, minister) that permitted people to interact appropriately with the role.

The size thresholds of 12 and 150 can be used as *rules of thumb* – heuristic guidelines – where we expect a new social order to accompany increased group size. When combined, the thresholds at 12 and 150 have implications for successful development teams. Virtual teams of role managers or team leads, drawn from each of the product teams, are the glue that binds a project into a small world. What happens as these virtual teams grow in size?

It is interesting to note that role teams reach a size of 12 (12 teams) at about the same time that the project reaches a size of 150, a number that, after all, is very close to 12 teams of 12. In this way, the rules of 12 and 150 converge. TSPm, on a modest-sized project, fits within limits imposed by these rules of 12 and 150. However, scaling TSPm beyond this size, perhaps to many hundreds or thousands, becomes problematic when the role teams that deal with inter-team coordination become too large. The next level of scaling appears to require either additional communication structures or substantial independence of subprojects.

The Organizational Chart Versus Self-Organization

Organizational structure can be a powerful factor in a project's success. In any organization, there are charts that show the official organizational hierarchy, but they probably do not represent the interaction patterns and functional organization through which work gets done – the result of self-organization that occurs in successful software development teams. Traditional organizational hierarchies are effective for imposing structure and control, but they are not effective for managing creative work in frequently changing environments such as those common to software development. Therefore, to manage effectively, we must work with the actual, self-organized network through which work gets done.

Fostering self-organization and flexible communication within a commonly understood structure solves this problem. The TSP role managers and role teams satisfy this need, providing a way to organize a project's information patterns for maximum efficiency and effectiveness. This form frees team leaders from constantly managing communication, allowing them to focus on strategic issues.

Formal leadership retains its importance for managing resources and setting business goals, but assumes a different role with respect to information, communication, and getting work done. A changed environment requires the network to change as well. Formal hierarchies are slow to change, which is insufficient in a dynamic environment. Self-organizing networks, however, are flexible. They adapt to a dynamic environment and can lead to success where less adaptable, formal hierarchies fail. Instead of trying to constantly restructure our formal hierarchies, we should look for ways to leverage the phenomenon of the self-organizing network. Self-organization within the role-team framework becomes the key to flexibility and meeting goals in an ambiguous and changing environment. ◆

Conclusion

The key actions for building successful team communications are to identify organizational needs, encourage the right roles, support self-organization, and coach individuals. In addition to encouraging the self-organization of role teams, consider the organizational priorities and support necessary to encourage and sustain the right roles. From a TSP standpoint, we

should coach teams and projects to tailor roles so there is a central focus for the project or organizational priorities.

Also consider additional ways to reduce the organizational path lengths. For example, encourage customer interface managers to form user groups, which reduce your path length to the user, probably to as few as two or three degrees. TSP coaching is another resource that must be kept to a short path length. Most effective is one degree of separation. For a successful effort, people need ongoing, one-on-one coaching.

As shown earlier, relying on a traditional organizational hierarchy makes a project vulnerable to single node failure and information bottlenecks, and does little to reduce path lengths. But we can use what we have learned about networks to address these problems in a flexible team environment.

Keep small teams tightly coupled with many internal links, as shown by the web network in Figure 1B. Fewer links between teams are adequate to maintain short, inter-team path lengths throughout the organization as shown in Figure 2. This model fits within human limits and scales up to a team of teams. Strong ties support the detailed and creative work within teams. Some team-to-team links are necessary to convert a project or organization into a small world. Weaker ties bind the teams to a project and make the network searchable. Role teams build communication paths starting from the context of important task domains. Role teams are a natural method for TSP to add these cross-team links.

The network model shows us how valuable functioning role managers can be to the success of small-world, self-organized networks. They can balance information flow, provide alternate paths if congestion develops, and make information easier to find. Fostering self-organization within teams and critical role-manager communication among teams can be highly motivating. Properly motivated and prepared teams are capable of extraordinary things. ◆

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About the Author



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E-Mail Etiquette

COL Kenneth L. Alford, Ph.D.

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E-mail is out of control, and you can help fix it by following the suggested rules of e-mail etiquette outlined in this article.

When I was first introduced to e-mail in the mid-80s, it was a wondrous invention. And I loved it! I could now reach out and asynchronously communicate with others regardless of time or space. The few e-mails that arrived each day were handled quickly and actually improved productivity.

From a trickle in the 1980s, e-mail grew to a flood in the 1990s. Today the flood has become a tidal wave. It is not uncommon for workers to receive more than a hundred (and in too many cases, hundreds) of e-mails every day. Important e-mails are too often buried in a sea of minutia, and e-mail can now actually reduce productivity.

Here are some simple rules to keep in mind so that you can be part of the solution and not add to this growing problem:

- **Put the Bottom Line Up Front.** In the first sentence of your e-mail, explain why you are sending the e-mail: what you need, what your position is, what the problem is, what your solution is, etc.
- **Keep It Short.** Get to the point. Avoid *stream-of-consciousness* e-mails that ramble aimlessly.
- **One Message, One Topic.** Limit each e-mail message to a single topic, request, comment, or position.
- **Talk Face-to-Face.** Too many e-mails are sent to people who work in the carrel or office next door. It is often easier and faster to talk with a co-worker than to send an e-mail message, but too many of us type and click instead of getting up and walking a few feet.
- **Keep Subject Lines Accurate.** If a message from a subordinate triggers a new thought, make sure that you change the subject line before you click *Send* on your return message.
- **Use Subject Tags.** One or two topic words at the beginning of an e-mail can make it easier for recipients. For example, tags like *Budget* or *Project Kolob* can help readers quickly evaluate incoming messages.
- **EOM Tag.** Establish an office code such as *EOM* [end of message] or *END* that can be placed at the end of an e-mail subject line to indicate that the entire message is contained in the subject line. For example, *Dept Mtg, Tues. 1100, Rm 101, EOM*. This saves readers

from having to open those messages.

- **Read Twice, Send Once.** Proofread your e-mails before you send them. Typos in dates, times, locations, and facts can result in tremendous wasted effort. Stop the problem at its source.
- **Self-Censor.** Never write and send an e-mail when you are angry or frustrated. You will regret it later.
- **Sending Messages.** While it may be easier to send your message using an organization-wide distribution list, the chances are good that everyone does not need to receive it. Send messages only to people who need to read them.
- **Forwarding Messages.** Whenever possible, do not forward messages!
- **Replies to Messages.** Just because an announcement was broadcast to everyone in your organization, it does not mean that you need to reply to everyone. Pick your *To* and *Cc* recipients with thought.
- **Less Is More.** Reply to or generate e-mail only when necessary. If you had a nickel for each "Yea, I think so, too" or "That's a good idea" e-mail you have received, you could probably retire in comfort.
- **Use E-mail Tools.** Ensure you have a spam filter. Use rules and message filters to remove clutter from your inbox.
- **Check Attachments.** Take a moment to open each e-mail attachment before you send it – to ensure that you are attaching the latest version of the correct file.
- **Follow E-mail Etiquette Rules.** There are numerous Web sites that list rules of e-mail etiquette. Please take a few minutes to visit those Web sites, and encourage employees in your organization to do the same.

On days when e-mail is particularly oppressive (which lately has been most days), I sometimes fantasize about inventing a new product: *The E-mail Terminator*. It would work something like this: Every night at midnight, individual employee e-mail counters would be reset to zero. Throughout the day, the counter would keep track of the number of e-mails sent. When the counter reaches a preset number, the e-mail server would automatically turn off that employee's ability to send e-mail. That user would have to wait until the following day to send e-mail again. (That

actually was not my first idea, but I think that the *Exploding Keyboard* idea might have difficulty receiving Occupational Safety and Health Administration approval.)

May your efforts to tame your e-mail be successful!♦

Additional Reading

1. E-mail Netiquette. Yale University Library <www.library.yale.edu/training/netiquette>.
2. E-mail Etiquette. West Virginia University <<http://oit.wvu.edu/support/tss/email/Email%20Etiquette.pdf>>.
3. Online Writing Lab. Purdue University <http://owl.english.purdue.edu/handouts/pw/p_emaillett.html>.
4. E-mail Etiquette. Tufts University <<http://ase.tufts.edu/its/emailEtiquette.htm>>.

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A Manager's Guide to Supporting Organizational Change: 10 Lessons Learned®

Esther Derby

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Change has become a constant in organizations – whether through choice or changes in the external environment. Change is seldom easy, but managers can make a difference by communicating reasons, respecting values, attending to emotions, and providing as much information as possible.

By now, most of us have heard the phrase, “The only constant is change.” Markets change, technology changes, new economies emerge. The expectations of the workforce shift, demand wanes or grows. Our ability to respond successfully to change – as individuals and organizations – marks the ability to stay vibrant and competitive or fall by the wayside.

Whether the change involves an entire enterprise, reorganization, or the adoption of new software development methods, there is one constant in any change: People need and crave information, time, and support. When those factors are absent, transitions flounder, and hoped-for changes fail.

Managers at all levels can contribute to successful transitions. In this article, I will draw on my experience observing, leading, and participating in organizational change to distill practical ways that managers can support intentional change.

But first, here is a little tale.

A Cautionary Tale

Not long ago I visited a large, well-established, multi-national company. After spending a day talking with developers and project managers about software development methods, I had a chance to talk to the chief information officer (CIO).

The CIO spoke about his vision for transforming the organization. He bounced with enthusiasm as he strode back and forth across the room and spoke about reorganizing his 800-person software development department within the next three weeks and shipping a vast new product – Galileo – in six months.

“I’m bringing in training so 11 teams can hit the ground running next month,” he enthused. “I’ve announced the reorganization and appointed a steering committee. Of course, we still have to finish the Green River project and deliver that on time.” He frowned for a moment, and then resumed his energetic bouncing.

“We’ve been working on this product for three years, but with this new organization, we’ll finish Green River and ship Galileo by the end of the year!”

As the CIO began to wind down, I asked if he was interested in hearing what I had learned from the people actually building software. “They love it, right?” he asked, pumping his fist.

But when I reported that most of the people I had spoken to did not understand the reason for the change, the CIO became annoyed. “Over two-thirds of the people I talked to feel like senior management is ramming this change down their throats,” I said. “They don’t see the urgency, and they do not see how it’s going to help.”

“What do they mean ramming!?” the CIO demanded. “They’ve had plenty of time to get onboard. And they say they don’t know about this!” he was nearly shouting. “I talked about it at our annual meeting last quarter!”

I am sure this executive had a clear vision and goal for transforming his organization. I am sure he considered the need and urgency to change. I know he considered many options before deciding on how to reorganize the department and adopt a new way of working.

Like most CIOs, this man is bright and cares about the success of his organization. And he fell into a common mistake: He assumed that since he had thought through the implications of the change, announced the change in an important setting, and established an aggressive goal, he had done his job. Sure, he has gotten a steering committee (made up of people who do not actually write the software, and who had so far produced a PowerPoint presentation). And, he funded some training.

Given the financial reserves of the company, they may survive for a while. But this CIO’s hopes for transformation are doomed. What could he have done, and what can other managers do to succeed at transitions in organizations?

Communicate a Compelling Reason to Change

Most people want to know the *why* behind a change, the reason they should do things differently. Announcements are not enough. For example, “Starting in April, we will be using a new method!” does not convey a compelling reason to change. Without an understanding of the reason for a change, any proposed change seems arbitrary – the latest management whim.

Though the end goal may be wonderful, the process of change brings disruption, discomfort, and loss. Most people will endure the downside of change to achieve a compelling goal or save something they value – but not to provide a prerequisite to someone who seems disconnected and capricious.

One manager announced an aggressive change agenda with the following rationale: “I need you to be up and running the new development platform by June. My birthday is in June and this will be my birthday present.” It is hard to imagine an announcement that would have done more damage to motivation and goodwill.

In contrast, another executive stood in front of his department and laid out the facts: “We’ve been very successful in the past. Perhaps we’ve been too successful, and we’ve lost our edge. We are losing market share. Our competitors are building better products and building them faster. The way we have done our work has served us well in the past, but it is no longer serving us. I know we can regain our place in the market. And to do that, we have to change.” He went on to describe his vision for how the department needed to reinvent the way they worked.

People did not leave the department meeting “pumped up;” they did leave with a sense of purpose and a clear understanding that their leader was asking for shared sacrifice to save the company they all cared about.

Communicate Formally and Informally

Formal communications – meetings and memos – are necessary, but they are not sufficient in times of change and transition. People need to know how the new direction relates to their day-to-day work. Managers at all levels need to talk about how the change relates to day-to-day decisions, actions, and events [1].

Look for opportunities to discuss differences and similarities with new methods or structures during team meetings and one-on-one meetings. Look for water-cooler moments and other informal opportunities to tie the new regime to current concerns.

One group I worked with was moving from a waterfall life cycle to iterative, incremental development. Soon after the first announcement, a group manager set up a special forum to answer questions and hear concerns about the transition to iterative, incremental development. During the forum, the group manager led the discussion to help people start thinking about how their work would change, and what they would need to do differently to deliver software incrementally.

Most people need to hear a new idea many times before they absorb and integrate the new information. This is especially true when the new way of doing things is significantly different from current practices. As people hear about a change and talk through how it supports company goals, they mentally rehearse how they will accomplish work using different means or different methods. For a significant change, this will not happen in a day or a week. Significant transformation requires time.

Personalize the Message: What Does This Mean for Me?

People want answers to questions about how a change will affect them, and how *his* or *her* job will change.

In one workshop on agile methods, it dawned on a vice president that transitioning to agile development did not just involve developers and testers. He had to change the way he did his job, too. As this sunk in, his demeanor changed, and his participation in the workshop trailed off.

During a break, I talked to him. "Am I even going to have a job once our teams are using agile methods?" he asked.

Until people know what part they will play, and how the change will impact them directly, people withdraw into worry. Their energy is not available to work on change or on the business of the organization.

Someone on the executive level can only answer questions like this in generalities; people will look to their supervisors to gain information. The more preparation and information direct supervisors have, the better equipped they will be to answer questions.

And, it is impossible to have all the answers. Draw the picture of what you do know and the boundaries of what is unknown.

Acknowledge the Unknowns

The maxim, "I'll communicate something when I know something," does not work in change situations. In times of change, people fill in the blanks with their worst fears. Every bit of factual information helps.

The statement, "I don't know," is more helpful than no communication at all. When you do not know an answer, tell people when you will report on progress finding answers.

Most people do not expect their managers to be perfect and all-knowing. They will accept when you are not able to find answers. Be sure, though, not to let questions fall into a black hole. Reporting that you have no new information is better than silence.

Surface Rumors and Fill in the Blanks

At Q-Factor, a software company, I observed a large staff meeting where a project team was discussing an upcoming management transition. One fellow leaned over to the person next to him and joked that the new management team was going to lock the team down for weekend overtime. By the next day, the rumor had spread to the entire team. People latched onto the original joking statement as fact. Team members were incensed. Already distracted by news of the change, their productivity plummeted. The team spent the day grumbling and planning their (angry) response to the anticipated demand for overtime.

Rumors thrive on lack of credible information. One simple thing managers can do is regularly ask, "What's the scuttlebutt? What are the latest rumors and gossip?" Bringing rumors out into the open deprives them of their power and provides a chance to replace rumors with solid facts, or at least informed denials.

While it is important to quash rumors, they can also be a source of information. Rumors also provide a clue about what people are worried about, and where they are having trouble finding information.

Look for patterns and fill in with factual information and frank discussion of unknowns.

Practice What You Preach

When management actions do not match the changes they are asking others to make, people grow cynical. One director extolled the virtues of self-organizing teams to the technical staff, but continued to dictate the details of team membership and assignments. He even stopped by developers' desks to give them advice on how to write code. He talked the talk but his actions showed he did not walk the walk of self-organization.

Another executive introduced a major cost-cutting initiative to his organization. He directed middle managers to cut training budgets and cancel orders for replacement equipment. Most managers understood the reasons for reducing costs, but felt resentful when they saw the executive redecorating his office. "Why should we scrimp while he's looking at carpet samples and fabric swatches for his new digs?" one asked. "He's making it harder for me to get work done and to retain staff."

Successful change requires changes from everyone, not just the lower levels of the organization. Wise managers do not ask other people to make changes they are not willing to make themselves.

Sometimes it only looks like there is a contradiction between what the executives say and what the executives do. For example, the corporate jet may look like an unnecessary expense, but careful financial analysis reveals that the jet actually saves money. Explain the apparent inconsistencies to avoid the appearance of hypocrisy and the resultant cynicism.

On a smaller scale, one manager in a change effort attended a local conference during a period of budget cutting. He was careful to explain to his peers and staff that the period for a full refund had passed by the time the cost reduction edict came down, and he felt it was wiser to attend.

Acknowledge and Build on What People Value

In periods of change, people struggle hardest to keep what they value most. People do not change based on logic; they change to keep something that is valuable to them.

Unfortunately, it is not always easy for people to articulate what they value about the way they do their work. I find that asking the question a different way helps surface the information. As people work out the details of how the new ways will work, ask, "What were the strengths of the way

we have been doing things? How do those strengths map to the new way?"

Acknowledge that the old way was not stupid or bad – it worked well at one time, but it does not fit the current context.

Reframe Resistance

When people resist, the natural tendency is to push harder, give more reasons, or even threaten. But exploring the *response* to change can be a source of important information.

According to Dale Emery [2], people's response to change involves four main factors:

- Expectations.
- How the change has been communicated.
- Relationships with the person requesting change.
- Other factors in the environment.

When faced with a change, some people are afraid they will not be able – or will not have time – to learn the new skills, methods, or procedures to be successful with the change. People who do not believe they can be successful are reluctant to try a new way.

Sometimes people are not interested in learning new skills; that is worth discovering, too.

How a person feels about his or her direct manager and *management* colors what they hear. Even if people have never spoken to the senior executive, they have a relationship with him based on their good or ill regard for him. Communication from a well-respected executive will garner more attention than communication from one they regard as inept or irrelevant. And people are less likely to want to go through the disruption of a change for someone with whom they have a negative relationship.

Past experience with change will affect how people greet the current change initiative. When past change efforts have failed, fizzled, or flopped, people will be understandably skeptical. When you hear someone say, "It won't work here," or "We've tried that before," it is a clue that people have been burned in the past. Arguing will not help, but curiosity may. Probe to find out what is behind the categorical statements. You may uncover useful information that will help you avoid pitfalls with the current change. Or you may be able to point out what has changed since the last time that makes the change more likely to succeed this time.

Resistance is a label that cuts off a conduit for information. Resistance is when someone is not doing what you want them to or expect them to. Listen and probe to find out why.

People Do Not Resist Change, They Resist Coercion

I used to agree with people who said, "People hate change." In reality, people choose change all the time – big changes. People choose to marry, to have children or adopt children, to divorce, to move in with mom, or to join the military. These are all life-altering changes. Yet people choose them freely. Most of the time, people buck up and muddle through when change is thrust upon them by circumstances. Most people manage to find their way through to the other side of that change event. Clearly, people do not hate all change, nor do they resist all change. I have come to realize that they do not resist change itself; they resist coercion.

People will reject even insignificant changes when they feel coerced. One team was willing to try agile methods. They were willing to move into a shared workspace and try pair programming. But when the facilities manager informed them they had to give up the coffee pot one of the team members had brought from home, they balked – even though the facilities manager was willing to allow an industrial coffee maker provided by the company cafeteria.

The reality is, it is impossible to make someone else change. Lay out the reasons, acknowledge the emotions, provide support, and give people a chance to choose change.

Not everyone will change at the same pace, and some people may choose not to change at all. If there is another place in the organization where they can be valuable, support them to find that place, and if there is not, support them to move on.

Empathize

Every so often, I run into a manager who is not very patient with people going through change. Stan was one such manager. "Move on or move out," he declared at a staff meeting. "We're not paying you to moan about the way things used to be." Another manager listened to his team grieve about the changes they were experiencing and stated, "I've thought about it, and there's no reason for you to feel that way."

In reality, change involves loss: loss of routines, relationships, turf, expertise, and status [3]. It is normal for people to experience intense emotions during times of change. Pretending those emotions do not exist will not make them go away; failing to acknowledge emotional responses may actually prolong and amplify them.

This does not mean managers need to play psychologist; they do need to listen,

empathize, and acknowledge that feelings are real and valid.

Real change takes time. The CIO I talked about at the beginning of this article expected to complete a major transformation in a matter of weeks. Transitions that involve significant changes – new methods or reorganizations – are measured in *months* and *years*, not days and weeks.

Expect that the world around you will shift during the transition and be prepared to adapt to new opportunities and circumstances. Be willing to refine goals and plans based on new information from both inside and outside the organization. Plan for small wins and celebrate those wins.

Start change communication with a compelling reason for the change, then communicate, communicate, communicate until the people begin to forget they ever did things a different way.♦

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2. Emery, Dale. "Resistance as a Resource." Cutter IT Journal 14.10 (Oct. 2001).
3. Bridges, William. "Surviving Corporate Transitions: Rational Management in a World of Mergers, Start-Ups, Takeovers, Layoffs, Divestitures, Deregulation, and New Technologies." Mill Valley, CA: William Bridges and Associates, 1988.

About the Author



Esther Derby is well known for her work in helping teams grow to new levels of productivity, and coaching technical people who are making the transition to management. She is one of the founders of the Amplifying Your Effectiveness Conference and is co-author of "Behind Closed Doors: Secrets of Great Management." Derby has more than two decades experience in the wonderful world of software. She has a Master of Arts in organizational leadership.

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Transforming Cultures: A New Approach to Assessing and Improving Technical Programs

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Our previous article in February 2004 CROSSTALK, "The Human Dynamics of IT Teams," focused on the personality dynamics of systems development teams, and factors contributing to the effectiveness and success of these teams. This follow-up article takes the next step, providing a unique methodology for assessing program dynamics, and for formulating action plans for targeted change. Our goal is to describe the different elements contributing to culture – a key area of attention required to meet Department of Defense transformation efforts in the years ahead.

A major theme is emerging from today's Department of Defense (DoD) transformation efforts: cultural change. As the DoD moves towards netcentricity, bringing power to the edge, there is shared recognition that successful transformation requires fundamental changes in DoD culture. How will we accomplish this change? It has been a common question at conferences and forums across the DoD, and the answer has been consistent: "Changing culture – that is the hard part."

Transforming cultures is difficult because culture emerges from the myriad of elements and forces, problems and

choices that individuals, teams, and organizations face every day. Culture changes slowly, incrementally – and often painfully – one person and action at a time. Deliberate culture change comes only when the individuals who make up systems and teams look at their daily work from different perspectives, open up to the possibility of new choices, and see the intricate interrelationship of elements and forces that make up human systems.

Over the past few years, we have refined a practical model for breaking down and assessing these diverse elements comprising culture. Called the *Wrapped Cable Model*¹, it is a comprehensive and scaleable tool for diagnosing and interpreting the challenges that exist within technical organizations, programs, and teams. The Wrapped Cable Model pulls together eight interdependent parts, each playing a critical role (see Figure 1). If a fray exists in any part of the model, the entire cable – and the entire organization – suffers.

structure ultimately carries its own mission as well – a specific statement supporting the larger whole. The mission is a unifying statement that defines and focuses the group's work and driving purpose. In an ideal setting, the mission presents a clear and unifying purpose, and is understood, respected, and acted upon by all team members.

Often, however, the mission is not adequately articulated, or related to the goals people are actually working toward. When a mission fails to provide focus or unification, or is too vague or rigid, the organization can fall out of balance and problems can arise. For example, large programs often involve diverse stakeholder organizations with differing perspectives of what the mission really is. One may concentrate on delivering a system that offers the lowest life-cycle cost; another may concentrate on allowing the future substitution of innovative technology. Mission clarity and the right incentives are critical to program success – and only come when the program team overtly acknowledges and focuses attention to these differences. Mission clarity can also help address the dual problems of scope and requirements creep; using the mission as a central tool in trade-off analysis allows a team to carefully evaluate its options, even amidst the complexity of technical decision making.

Assessing Programs Using the Wrapped Cable Model

Let us start by outlining the eight elements of the Wrapped Cable Model, with examples from DoD programs. As with any useful model, it is flexible, designed to focus on the most critical elements of a group's culture, and the relationship each has to others. The model is not designed – nor is this article presented – to be the definitive statement on leadership, organizational structure, mission, culture, or change. It is, however, a useful tool for stepping out of and reflecting on the systems within which we work.

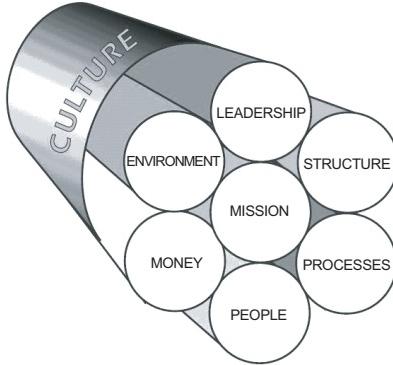
Mission

A central element of every organization and program, the mission is strategically placed at the center of the Wrapped Cable Model. While the DoD may share the overall mission of defending our country, each organization and team within that

Leadership

Leadership is ultimately responsible for bringing the mission to fruition and is, therefore, critical to organizational and team effectiveness. We define leadership as the intentional use of power with individuals or groups toward some desired end. As such, anyone who exercises his or her power to effect change is a leader. At any level, leaders set the tone and direction of the program or organization. For meaningful change to take place in any situation, leadership must be exercised at all levels; even those without organizational

Figure 1: Wrapped Cable Model Elements



- Mission: Unifying statement defining the organization's work and driving purpose.
- Leadership: Responsible for bringing the mission to fruition, setting both tone and direction.
- Structure: How formal power is distributed and labor is divided.
- Processes: How work is organized to accomplish the mission.
- People: How relationships are managed, and how human capital is leveraged for greatest effectiveness.
- Money: Funding issues often signal deeper concerns, and lead to conflict between the mission and constraints.
- Environment: The collective set of needs, expectations, and constraints set by the external environment.
- Culture: The set of commonly held rules, expectations, and consequences that ultimately identify who we are.

authority need to exercise the power they have, be it relational, intellectual, tactical, etc., for missions to be fulfilled and for change to take root.

For the DoD, the regular reassignment of military leaders represents a unique formal leadership challenge. While civilian leaders provide needed stability during these transitions, uncertainty and readjustment inevitably accompany these changes. Will the new leader be more externally focused with stakeholders, or more internally focused on team process? When tradeoffs between scope, time, and cost are required, what will happen? All leaders bring their own unique experiences and interpersonal style. Effective leaders understand their impact and act to support both the mission and the needs of the people involved. In addition to the formal leadership of any system, however, we must also pay attention to the power exercised by all players regardless of their level, title, or tenure within the project or organization.

Structure

The structure of an organization illustrates how formal power is distributed and labor is divided. Structure is closely linked with leadership because examining it often reflects the alignment or gaps between authority, responsibility, and accountability. Such gaps can lead to miscommunication and inefficiencies, ultimately detracting from the group's ability to meet its mission. Power distribution is not always reflected in the stated organizational structure, impacting both cohesiveness and effectiveness.

Many change efforts acknowledge the need for personal empowerment of individuals and work teams, but unfortunately go on to implement structures that maintain the status quo of hierarchical, top-down flows of power and authority. For example, this frequently impacts programs with integrated product team (IPT) structures. Often, IPTs are directed to make technical decisions, but lack the authority to implement them. Structure is often an issue with respect to stakeholder management as well. While there may be an IPT responsible for user requirements, there may be few structures for communicating this information to others, resulting in miscommunication and challenges during implementation.

Processes

The process element examines how work, people, and communication are organized and acted upon to accomplish the stated mission. Are teams used to accomplishing

Wrapped Cable Model Questions

Here is a starting point:

- What is the mission of your organization or program? How does it link to the overall DoD mission? How does the work you do right now support that mission?
- How are incentives aligned with the mission?
- How does your mission differ and/or is the same as other parts of the program?
- What does success look like? How do you know you are successful?
- To whom do you look for leadership? Who has the power to get things done?
- Who do you have on the speed dial of your phone? Why?
- Where is your organization chart? How does it relate to the real connections between people?
- How do you use your work breakdown structure? Where is the critical path?
- When do you encounter conflict? How is it handled when you do?
- What could make you more efficient?
- How do you know where your role/organization/scope starts and ends?
- How is morale? If asked six months ago, would the answer be different?
- Who is your key customer? Who is the true end user?
- How are customer/user relationships created, maintained, and ended?
- How do users differ from beneficiaries? How is the difference reflected in your stakeholder management processes?
- What metaphor, image, or picture would you use to describe your program/organization?
- What stories do people tell to new employees? To each other?

the mission? What is the strategy used? What is the role of technology in the group's efforts? A new system must be accompanied by appropriate policies and procedures – the processes that make the technology useable and ultimately accepted by stakeholders, including the users. Processes that fulfill the mission efficiently and at a high level of quality are working well, while processes that produce insufficient, inferior, or untimely products are not.

One way to assess process effectiveness is to ask team members about the program's critical path and how they contribute to it. How does what they are working on support the broader goals? Process can pose a special challenge, for example, for distributed teams facing the dual challenge of completing their own work and communicating those results to others. While policies and procedures are an important tool for managing processes, there are many other pieces to this puzzle as well.

People

Stakeholder management, interpersonal relationships, role clarity, and human resource concerns are the heart of the people dimension. How is human capital leveraged for the greatest organizational effectiveness? Organizations are human systems, and human systems function best when there is an established set of standards to recruit, train, and develop people. Also critical to the people component of the model is a group's reward system. Change, if not success in general, depends on people feel-

ing both accountable and empowered to act, to decide, to suggest – at times even to risk failure. Unfortunately, people often find themselves in systems that talk up accountability and risk, but reward only success. A group's reward structure tells a lot about what a culture truly values. When the people in an organization are unrecognized, unrewarded, or underdeveloped, this strand of the model is failing and the organization suffers as a result.

Stakeholder management is a particularly vital aspect of the people element. Too often, programs objectify stakeholders into a single collection of interests without acknowledging the variable levels of influence, power, and need. Failing to overtly delineate the differences between primary users, secondary users, beneficiaries, and their customers can cause unanticipated problems during deployment.

Money

Funding usually represents a defining constraint, and can be a source of significant stress and conflict. Such conflicts can be serious and immediate, as financial needs often demand attention before other issues. What many fail to acknowledge, however, is that funding issues often signal deeper concerns related to stakeholder communication, mission clarity, and requirements creep.

Unfortunately, funding problems often spark a crisis mentality, aggravating stress and reducing the team's ability to consider both strategic and tactical options. When money is compromised, it is time to con-

sider other directions. Sometimes, budget allocations can be changed, but when they cannot, taking a break to reconvene a strategic planning process may prevent a downward spiral from which the program cannot recover. Therefore, addressing connected issues in mission, leadership, and structure – all the other elements of the model – impacts the stress and limitations of financial concerns.

Environment

An organization's environment is the collective set of needs, expectations, and constraints determined by external factors (e.g., political scrutiny, operational setting, and technological change). If a program is effectively interacting with its environment, then program boundaries are clear, external dependencies are recognized, and information flows both inside and outside the program.

Interoperability is a common environmental need. With increasing emphasis on systems of systems and interoperability, the ability to *talk* to one another is often critical. Despite this need, programs are often relatively autonomous, with program managers acting with independent authority. While this benefits the program itself, it can lead to difficulties in other areas, particularly for program executive officers and enterprise-level chief information officers (CIOs). These are environmental complexities that are revealed and addressed in a Wrapped Cable Model assessment.

Culture

Culture emerges from all the other

Wrapped Cable Model elements and results in a set of commonly held rules, values, expectations, and consequences that shape and reflect the spirit and nature of the program or organization. Culture, on one level, is the sum of the elements that comprise it – leadership, structure, processes, people, and money – all acting in the environment toward a mission. At this same time, however, culture is a dynamic all its own, a synergy greater than the sum of its parts. So while the elements of a system act on culture, culture defines and acts on these elements as well. This model suggests that if you change any element of the cable, culture will also change, but as the model also shows us, the pressure of the culture keeps internal forces in the model tightly in place and static. Cultural change is hard.

Often, compelling pictures of culture comes from the images people give of their teams. On a recent program assessment, one team we interviewed consistently used images of forest fires to describe their operations; another team generally reported images of hectic family get-togethers and reunions. Not surprisingly, morale differed dramatically between these teams. The striking point, however, is that both teams were part of the same program operating in different locations, providing a unique insight into the tremendous complexity and colliding sub-cultures of large, distributed programs.

Intervention Based on the Wrapped Cable Model

So far, we have defined the model ele-

ments and illustrated their impact in organizations and programs. We have come to regularly use the model as part of a broader assessment and development methodology with programs and teams seeking both to solve immediate problems and to facilitate long-term cultural change. Given this, our next step is to use the Wrapped Cable Model assessment results to design and implement development activities. The Organization Intervention Matrix (Table 1) shows how we have mapped some of the common DoD challenges introduced in the preceding section against the model elements. The last column then outlines approaches we took to address these issues once detected.

The following bullets describe selected solutions/approaches we have delivered in more depth. In each case, the development activity is designed specifically to target the issues revealed through the Wrapped Cable Model assessment.

- **Strategic planning and problem solving.** Structured as one- or two-day workshops with leadership or delivery teams, these sessions are used to identify how the organization's strengths can be used to overcome weaknesses, leverage opportunities, and mitigate risks – leading to specific action plans for individual and team implementation. Teams can often use this forum to identify better ways to communicate their strengths, both within and beyond the organization.
- **Team development workshops.** These workshops are designed to provide leaders and teams an awareness of their personal styles and how these styles both contribute to and inhibit team success. Personality style instruments can be helpful to this end; the decision of which instrument to use, if any, is based on assessment feedback. Participants then use resulting insights to develop both personal and team action plans for resolving program challenges, and strategizing how best to rally around and contribute to the shared mission.
- **Team training workshops.** These sessions provide struggling teams with targeted skills training or development. This includes interpersonal and relationship management skills training in active listening, communication, conflict management, negotiation, meeting management, and/or group facilitation – driven again by assessment results.
- **Leadership development training and coaching.** Whether a group training or a one-on-one interaction

Table 1: Organization Intervention Matrix

Challenge	Mission	Leadership	Structure	Processes	People	Money	Environment	Culture	Solution or Approach
Scope/Requirements Creep	● ○		○ ○ ○	● ○				●	Strategic planning, problem solving, and mission realignment.
Inadequate Stakeholder Management		○		○ ○ ○			●	●	Leadership and group training, including communication and feedback to end users, sponsors, stakeholder groups, and oversight teams.
Integrated Product Team Management	○	● ○	○ ○	● ○				●	Organizational structure analysis and team facilitation, development, and/or skills training.
Interoperability Issues	○ ○	● ○ ○ ○ ○	○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○	●	●	Strategic planning, organizational structure analysis, workgroup facilitation, and team skills training.
Leadership Transitions		● ○ ○ ○	○ ○ ○ ○	● ○ ○ ○ ○ ○				●	Leadership training and coaching, group training, goal refinement, and leader introduction events.
Distributed Team Management	○	● ● ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○	○ ○ ○ ○ ○ ○ ○ ○	●	●	Leadership training and coaching, structure analysis, team development, and skills training.
Technical Innovation – Difficulty and Risk	● ● ○ ○ ○ ○ ○ ○ ○ ○	● ● ○ ○ ○ ○ ○ ○ ○ ○	● ○ ○ ○ ○ ○ ○ ○ ○	● ○ ○ ○ ○ ○ ○ ○ ○	● ○ ○ ○ ○ ○ ○ ○ ○	● ○ ○ ○ ○ ○ ○ ○ ○	● ○ ○ ○ ○ ○ ○ ○ ○	●	Strategic planning and problem solving, leadership development and coaching, risk communication.

● Signifies points of primary connection or concern
○ Signifies points of secondary connection or concern

	Information Technology Policy Team	System Development Team	Technical Team
Expressed Problem	CIO concerned that his team was responsible for a wide range of initiatives yet was failing to communicate activities within those in related areas – even though the team works in the same office.	System team in requirements phase encountered diverse and conflicting needs from different organizational leaders – with no clear lead system owner.	Technical team implementing a mandated system encountered user resistance. The technical team was confused by this resistance given the technology improvements offered by the new system.
Assessment Finding	<ul style="list-style-type: none"> M and L: Staff was unclear about mission and leader's expectations. S: Silos lead to focus on individual performance, inhibiting cross communication. Pr and P: Few formal team meetings or functions and a lack of skill or training on how to interact with and communicate with each other. E: Customers confused by inconsistent communication from CIO team. <p>The team was missing efficiencies that could be gained by sharing information, and the office was sending mixed messages to customers. Team reported a lack of clarity in expectations and little interaction with one another.</p>	<ul style="list-style-type: none"> M and L: Leaders and subordinates did not agree on scope, focus, and nuances of the mission and goals – and who should have accountability for elements of the project. S: Ambiguity of project ownership reflected in organizational chart. Pr and P: Group had no skill training and had no process to clarify or communicate their confusion. <p>Interview results and project artifacts signaled a lack of agreement on program mission and scope from the most senior levels of the organization on down.</p>	<ul style="list-style-type: none"> Pr: Processes were not in place to teach and ensure user-centered customer service. P: Team members needed communication, listening, customer service skills, and incentives that rewarded team members for using those skills effectively. E: End users complained about poor, rude, and unhelpful customer service. <p>Technical implementation team and Help Desk personnel needed better interpersonal skills for empathizing and supporting user groups learning the new technology.</p>
Development Goals	<ol style="list-style-type: none"> (1) Shift emphasis from individual delivery to a more collaborative, team-based work approach. (2) Develop and implement a strategic plan to identify better information sharing processes and pathways. (3) Take a <i>time out</i> from focused delivery to spend time together as a team. 	<ol style="list-style-type: none"> (1) Clarify central mission and evaluation criteria for system. (2) Identify a clear system owner with authority and accountability for decisions. (3) Reach consensus about key system capabilities, decision criteria, and program rules to baseline requirements. 	<ol style="list-style-type: none"> (1) Enhance team's ability to listen and empathize with user concerns, and influence user acceptance of the new mandated tool. (2) Provide technical team with new techniques for responding to user concerns.
Program Approach	<p>Strategic planning/team building designed and delivered that did the following:</p> <ul style="list-style-type: none"> Facilitated the group's membership in strategic problem solving, focusing on information sharing and establishing communication pathways and needed outreach activities to other groups and projects. Administered and gave interactive feedback on a personality style tool that gave team members insight into the benefits and liabilities of their respective communication styles – these both complement and struggle with each other on the team level. Drove all members to write and share an action plan that committed them to specific next steps. 	<p>Facilitated session designed and delivered to take group through a process to do the following:</p> <ul style="list-style-type: none"> Brainstormed mission and evaluation criteria. Ranked these options. Interactively and non-threateningly explored priorities, motives, and incentives of each group. Creatively problem-solved these options into a consensus on mission that suited the roles and structural limits of the organization. Concluded with all members writing and sharing an action plan that committed them to specific next steps. 	<p>Personality-style training designed and delivered to the group that resulted in the following:</p> <ul style="list-style-type: none"> Yielded insight into the learning, teaching, and communication styles of each team member. Enabled group to anticipate the styles of user groups and how best to connect to these customers and address their concerns. <p>Technical team then practiced active listening skills and brainstormed reasons for user resistance, generating <i>sell points</i> for working with users.</p> <p>Facilitated all team members to write and share an action plan that committed them to next steps.</p>

Note: In the row titled Assessment Finding above, M=Mission, L=Leadership, S=Structure, Pr=Processes, P=People, and E=Environment. Culture is included in the subtext of every element.

Table 2: Assessment and Development Case Studies

between a program leader and a coach, these efforts are designed to help leaders mobilize their powers more effectively to move the program team closer to its mission and goals.

Our team has used the assessment and development approaches described above with a variety of technical organizations

and programs, ranging from senior CIO/policy organizations, to program management offices, to systems development teams. The matrix in Table 2 pro-

vides three examples of this work with reference to the strands of the model most relevant to the situation.

Conclusion

Changing people and organizations is hard. Whether you are working with a large system or a small team, the challenge of truly developing it – changing it – is great. Everything is interconnected, so movement anywhere will bring about some change somewhere else, but is it the change you wanted? At the same time, the culture of a system – just like the casing of a wrapped cable – is such that there is often more pressure within not to change regardless of your efforts. With such dynamic forces facing you, where do you begin? What do you do? The Wrapped Cable Model is not offered as an answer to all of these questions, but it is certainly a starting point and a set of organizing principles and questions that start the change and development process.

Transforming DoD culture requires first identifying and then developing the critical links between team dynamics, leadership effectiveness, and program performance. We believe that the greatest success stories in changing cultures come from enhanced individual self-awareness and action planning, giving individuals the power and responsibility to create positive and actionable change. This article has described a method for starting this process, providing a way to break down cultural transformation into the daily choices that create true and lasting change.♦

Notes

1. The Wrapped Cable Model is the intellectual property of OKA in Fairfax, VA. The model was deployed in this team dynamics study, and is the underpinning model of the case studies herein. For more information on the Wrapped Cable Model or any other

element of this study or article, contact the authors.

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OKA

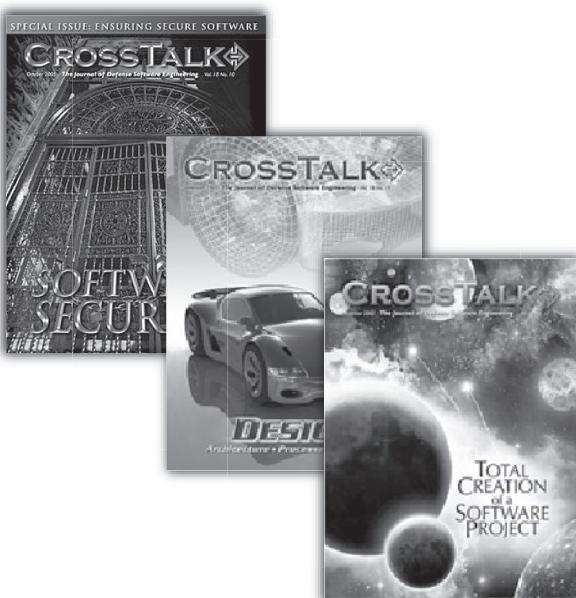
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Commandments for a Productive Development Environment

Dr. Randall Jensen and Les Dupaix
Software Technology Support Center

The software development industry has spent decades – with little success – attempting to make large productivity improvements through technology changes. But some projects have broken the productivity barrier by applying common sense practices to the people side of the development process. This article gives a set of commandments from lessons learned from projects with major productivity successes.

For more than 40 years, the software development industry has tried to improve productivity by implementing technology advances like the following:

- Third and fourth generation programming languages.
- Structured techniques (functional and object-oriented).
- Process variations (waterfall, rapid application development, rapid prototyping).
- Environments (programmer's workbench, .NET).
- End-user programming.

Some technologies have worked well. For example, the introduction of higher order languages (FORTRAN, etc.) reduced the size of software programs by as much as 70 percent. Despite this gain, however, if we measure the cost of developing a single source line of code from development start through product sell-off, we find that over the last 40 years productivity has increased an average of only one source line of code per person-month per year. That is, the average productivity for Department of Defense software has only improved from about 60 lines per person-month in 1960 to about 100 lines per person-month in 2000 for similar products. Thus, we see technology advances, including structured techniques, Computer Aided Software Engineering (CASE) tools, modern development environments, and process maturity have not provided the gains we anticipated.

Figure 1 [1] illustrates the vigor with which we have pursued a technology solution (silver bullet) to the productivity problem. The key to increased productivity must therefore be elsewhere. Weinberg demonstrates this by comparing the relative percentages of Software Engineering Institute publications in major activity areas of technology (tools), people (education), systems (development environments), and management to the relative productivity gain for each group. According to Weinberg, the most signifi-

cant productivity improvement area is, by far, the manager activity area.

Barry Boehm argues, "Poor management can increase software costs more rapidly than any other factor." But he explains in the following:

Despite this variation, COCOMO [constructive cost model] does not include a factor for management quality, but instead provides estimates which assume that the project *will be well managed*. [2, italics per the article authors]

Well managed does not work in this context. Without the management factors, we cannot distinguish between well-managed and poorly managed projects. Looking at the results from the 2004 Standish Chaos Report [3], most projects are not well managed today. The report divides projects into three classes: successful, challenged, and failed. About 28 percent of the projects evaluated were classified as successful, albeit they delivered an average of only 52 percent of the original requirements. Fifty one percent were delivered, but with significant overrun in cost and schedule while delivering only a fraction of the original requirements (challenged). About 18 percent were cancelled before delivery (failed). In other words, ignoring management factors in an estimating tool means that the projects are *consistently* not well managed. All projects have problems, but most often they are people problems rather than technological problems.

Recognizing the importance of good management in software development productivity is only the first step in process improvement. Moreover, good management is more than management style and organizational ability. Good management requires effective communication. Effective communication is, thus, essential to successful software development productivity gains.

This article will discuss team commu-

nication and management issues within the development environment and their effect on software productivity. Solutions to communication problems are largely common sense, can be implemented with minimal investment, and have almost immediate payoffs.

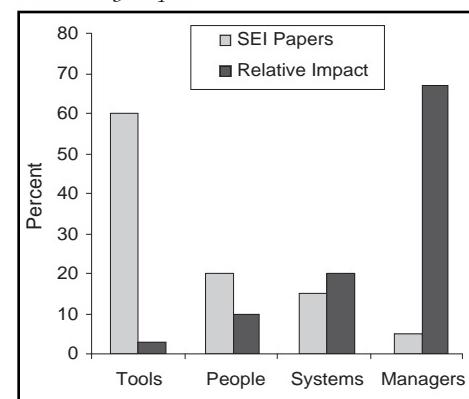
Over years of observing team communication and management issues, we have found four practical commandments that profoundly affect productivity. The four commandments deal directly with communication and collaboration effectiveness. The fourth commandment also addresses motivational and team issues, as well as a lack of continuity when members of the team are not available at all times. Since effective communication is the backbone of the discussion, we begin with a foundation in communication mechanics.

Mechanics of Communication

Broadly defined, communication means the act or process of communicating, and a process by which information is exchanged between individuals through a common system of symbols, signs, or behaviors. A related definition for collaboration is to work jointly with others or together, especially in an intellectual endeavor. Both elements are necessary to produce a software product.

Communication or information trans-

Figure 1: Number of Publications Versus Productivity Impact



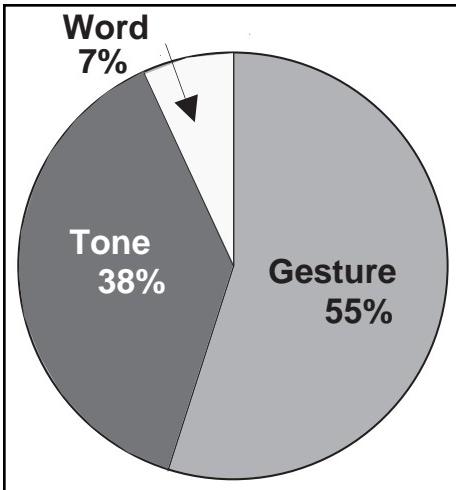
fer is one of the most important considerations in the world of productivity improvement. It dominates a large percentage of the time devoted to software development whether information is transferred via reports, analysis, problem resolution, or training. Several studies suggest the time spent in some form of communication exceeds 33 percent of a programmer's workday. Improved productivity, therefore, relies on the effective and efficient transfer of information.

Information Convection

In his book "Agile Software Development" [4], Alistair Cockburn described communication by comparing it to the dispersion of heat and gas. The concept is easy to apply to the dynamics of communication in the software development environment. *Convection currents* of information move about a work area just like the movement or dispersion of heat and gas. Air moves freely through an area unless the air is blocked or diverted by an obstruction.

Information moves in precisely the same fashion. When two programmers are seated at adjacent desks, they can discuss mutual problems freely and information flows unobstructed between the two people. The information flow, however, decreases as the programmers' separation distance increases. If a barrier or wall, real or perceived, is placed between the programmers, the information flow is further attenuated except for the information dispersion that occurs over the wall. If the programmers are placed in private offices, the information flow is blocked and becomes zero. Thus, instead of a communicated team effort, the programmer's attitude becomes, "I do my part and then throw it over the wall."

Figure 2: Transfer of Information in Presentations



Radiation

Information is also *radiated*. Radiation primarily occurs either aurally or visually. But it can also occur on a smaller scale from touch and smell. Information can also be radiated from whiteboards, paper, posters, sticky notes, and pictures. Because we want to maximize the amount of useful information being conveyed, we will discuss the optimal ways that information is radiated.

We will begin with close proximity communication and discuss the radiation sources one at a time. The optimal source of radiation communication is both voice and visual. Voice and visual communication is radiated by expression, gestures, pitch, volume, inflection, exaggerations, and movement. Two people discussing a problem at a whiteboard or at a computer terminal exemplify this ideal situation. This source of radiated information is optimal because of the response time between the speaker's statements and the listener's responses. The real-time nature of the conversation allows instantaneous questions to remove any misunderstandings and to clarify statements and questions.

The effectiveness of voice or visual radiation is supported by a well-known research study by Mehrabian and Ferris [5]. According to Mehrabian and Ferris, 55 percent of information in presentations is transferred by body language, i.e., posture, gestures, and eye contact (see Figure 2). Thirty-eight percent of the information is transferred through vocal tonality, i.e., pitch, volume, etc. Seven percent of the information transferred comes from the words, or content, of the presentation. These results are hardly surprising given that our body cues often convey the meaning of our words. For example, we all express many shades of meaning with the word *no* in normal conversation without giving much thought to the tone and body language accompanying the word.

The effectiveness of the information transfer, however, is diminished when we remove any source of radiation. For example, we can remove the visual part of the transfer by forcing the communicators to use a telephone. This eliminates all of the gestures, body language, and eye contact from the conversation. These important radiation sources are no longer available to reinforce understanding between the two individuals, and can lead to gaps in communication as well as misunderstandings. For example, we may change our language style when talking on the phone. This could lead to an inference of disinterest that seeing body language would

dispel. People cannot see you nod your head in agreement on the telephone.

The information transfer is further diminished if we also eliminate the subtle elements of a conversation radiated by volume, tone, sarcasm, or disappointment by using e-mail instead of the vocal conversation. Think of the times you may have called or been called by someone about a date or an appointment and they made an excuse about not being available. The loss of vocal tone may cause you to miss the *get lost* message they are trying to convey.

By removing all radiating sources of information, finally, information transfer is significantly degraded when we remove the ability to respond and ask clarification questions by communicating solely on paper. We lose not only the subtle elements of our voice communication, but also the real-time element of the conversation necessary for feedback from one to another. Feedback may still be present, but at a much slower rate. This impairs the integrity or accuracy of the feedback as well.

Paper is good for formality and structure, but very limiting for information transfer.

Drafts

In the convection paradigm, a *draft* is a flow of unwanted information.

Ultimately, information flow occurs whether or not information transfer is desired. Two people sitting within the range of a *radiator* pick up information even when they are not directly communicating. The receiver can, and often will, respond to the radiator if the information is related to a topic of interest. Remember the E.F. Hutton commercial? When the information is important to someone; they listen. The receiver may also respond to the radiator if the information is disruptive. How many times have you asked someone to turn down the television or radio?

Now that we have established the communication analogy, let us look at the four communication commandments for efficient, effective software development.

I. Thou Shalt Not Construct Communication Barriers

As explained, walls impede the flow of information. Consequently, walls decrease productivity. This impediment includes both visible and invisible walls. Private offices and cubicles raise visible walls. Assume a large open area filled with workstations that are spaced 10 feet apart, front-to-back and side-to-side. People can move freely about the workspace. Since they are not totally enclosed, communica-

tion between individuals in this matrix should be reasonably unimpeded [6]. This was the original cubicle concept.

But we raise invisible walls if we alternate rows in this matrix with personnel from another project. This spacing causes the distance between related people to increase from 10 to 20 feet. This increased spacing between members of the development team decreases information flow. Thus, the presence of unrelated people forms a literal wall that impedes the information flow. The same effect can be achieved by randomly placing people from a second project. The information radiated by people from the unrelated second project creates what Cockburn referred to as a draft – a flow of unwanted information.

Invisible walls are also raised by increasing the space between every third row, so as to create an aisle between the rows. Thus, the aisle acts as a barrier or pseudo-wall. The aisle significantly inhibits the flow of information because people are naturally resistant to communication across assumed walls.

The modern technological solution to communication barriers is e-mail and network communications. This solution has been posed for local communication support and to justify remote software development teams. Ironically, this technological solution raises greater barriers than the cubicle example. Where people have at least some physical contact when in adjacent cubicles, remote locations are sometimes separated by a thousand miles. The loss of visual and voice radiation, as well as real-time responsiveness creates a virtual wall.

Skunk Works

A classic example of effective information convection is the Lockheed Skunk Works [7], primarily because it dispenses with both physical and non-physical walls. The most successful software organizations have followed this paradigm in the organization of their development teams and environments.

The Skunk Works is an unofficial name given to the Lockheed Advanced Development Projects Unit, which was the home of the legendary Kelly Johnson and his production team. In makeshift quarters, Johnson's team developed the U.S. Air Force's first operational jet fighter, the P-80 *Shooting Star*, in only 143 days. Since then, a number of famous aircraft, including the U-2, the SR-71, and the F-117 have been developed by this production unit. The newest Skunk Works project is the F-35 Joint Strike Fighter.

As a generic term, *skunk works* dates back to the 1960s. The common skunk

works definition is a small group of experts who move outside an organization's mainstream operations to develop a new technology or application as quickly as possible, without the burden of the organization's bureaucracy or strict process application. Conventional skunk works operations are characterized by people who are free thinkers, creative, and who do not let conventional boundaries get in the way. The skunk works workspace is a physically open environment that encourages intra-team access and communication. Tools and processes are tailored and adapted to the project's requirements. Johnson established 14 Basic Operating Rules [7] to minimize development risk while maintaining the greatest possible agility and creativity in a lean development team. The rules covered everything from program management to compensation, and are relevant for any advanced research unit within a larger organization.

The management and teaming characteristics of the skunk works are important to our discussion of the commandments for a productive development organization primarily because they removed the walls or barriers that hamper communication.

Cube Farm

A counter-example to the skunk works approach to software development is the common cube farm. The cube farm violates all the rules for a productive environment in terms of both communication and collaboration primarily because they raise all the barriers that block communication. Unfortunately, the cube farm is the most common or widely used software development environment. Probably 90 percent to 95 percent of the development organizations operating today work in cube farms. A common programmer response when asked about their workspace is, "Scott Adams used our organization as the pattern for Dilbert." Many think Scott Adams is an alias for one of their employees.

In fact, the evolution of the cube farm, a grouping of cubicles that optimizes the number of people per square foot of floor space, did not begin as depicted in the Dilbert cartoons. In the late 1950s, typical offices were large open spaces filled with orderly rows of desks, and surrounded by private, closed offices for supervisory personnel. At about the same time, the Henry Miller Company approached Robert Probst [8], a professor of fine arts at the University of Colorado, to create a furniture design that would improve communication and productivity.

The result, the Henry Miller Action Office system, appeared in the mid-60s. The approach started with a large open area, sectioned to give workers semi-private to private enclosed spaces where needed, but the work area was arranged in a way to provide ease of worker-to-worker and worker-to-manager interaction. The design promoted communal space for interaction. The Action Office was an immediate success.

Enter now the facilities planner or *space police*. Their plan was to remove all of the wasted open space to maximize the use of a building's floor space. Or, in other words, maximize the number of people per power outlet. The resulting cube farm does just that by providing high human density, easy reconfiguration, and facility cost savings. But the saved space is more than counteracted by the resulting high price in loss of product development efficiency and productivity. Thus, decisions by facility planners have dramatically affected project schedules.

This is because the cube farm, as it exists today, virtually eliminates information convection by blocking all, or essentially all, personal interactions. The standard six-foot by eight-foot sound insulated cubicle lacks space for a two-person discussion, contains no whiteboards or other communication media, and pipes drafts (white noise) into the farm background to suppress any information that might escape into the environment. In short, the cube farm is the least likely of all facility arrangements to encourage improvements in productivity.

II. Thou Shalt Dedicate the Project Area

The physical project area should be allocated to a specific development task and not shared by multiple projects. From the standpoint of information convection, all of the information moving about the development area should be related to the same software development activity. Mixing projects in a specified area creates drafts. The drafts are created by mixing people from unrelated tasks. Dedicating a specific project area places all of the development personnel in close proximity with as few sources for drafts as possible. Adding people from non-related projects also separates project-related people, thereby limiting the information flow and inhibiting discussion and collaboration.

Another side effect of an undedicated project area is that the presence of people from another task prevents the team from forming into a focused, cohesive unit. An

extreme view of this phenomenon occurs when the project area is a general software engineering area accommodating multiple projects. Project teams never form in this situation.

Several years ago, a software team carried the dedicated workspace concept to a new level. The manager physically moved the team to an unused cafeteria. With soap, water, and the support of Canteen Corp. (the vending machine supplier), the team created a project area remote from outside interference. The members were experienced, but not individual superstars. The team evaluation at project completion received the highest performance rating (aka, Seer [9] basic technology constant) recorded at the time.

A corollary to the second commandment is that *outsiders* should not mess with the project area. The project area needs to be the project domain, controlled by the project team.

III. Thou Shalt Provide Utensils for Creative Work

When we consider tools for creative work, we usually think of the technology bucket. Technology-oriented tools include programming languages, computer systems, development environments, CASE and scheduling tools, and formal practices and procedures. All of these *technology* tools affect productivity, but, as stated, this impact is minor compared to the productivity impact of poor communication.

We have learned from experience and research that communication and collaboration are key to productivity and quality improvement. Our earlier discussion about information convection and radiation suggests that a completely different set of low-tech utensils are best for creative work. These utensils include the following:

- Whiteboards.
- Easel pads.
- Butcher paper.
- Post-it Notes.
- Kitchenette (break room with whiteboards).
- Informal discussion areas (brainstorming area).
- Popcorn.

None of these utensils fit well within a cubicle environment. Whiteboards, Post-it Notes, and popcorn can be physically placed in a cubicle, but for *individual* use only. Group activities using the above utensils require large cubicles that support teams rather than separate them. The space police look at team space as wasted and they want to pack more individual

bodies into that space. But, the environment we want to foster is people working together effectively. Effective team activities require utensils to support communication. You cannot tell a child not to eat with his or her hands without providing an alternative. Likewise you cannot build project teams without providing team-building tools.

When evaluating an organization's productivity, the presence or absence of these tools profoundly affects the result. Popcorn may seem like a strange tool, but it is almost always present in a highly productive work area. While popcorn does not analytically fit into any criteria for improved productivity, its odor seems to attract the necessary collaboration and enhanced communication. The scent of popcorn is indicative of people working together.

IV. Thou Shalt Not Share Resources

People-sharing between projects makes it impossible to form a genuine development team for any specific task. Part-time commitment does not permit shared individuals to fully participate in a task. This ultimately limits support physically as well as socially. Teams are sensitive to part-time participation. The part-time individual is, in a sense, an outsider and will not be trusted to carry out a task if not fully committed. Teams cannot gel when full-time participation in the project is not the norm.

Another phenomenon occurs when people are shared between two or more projects. Information that relates to one project becomes a draft for resources participating in a second project. Thus, when more than one project is active in a given area, the need for individual privacy becomes an issue due to the distracting information flow or noise in the area.

Food for Thought

Communication and collaboration are vital elements of the software development activity. When we accept this as a truth, we recognize the importance of making communication effectiveness a priority in project planning.

There are some important issues related to the success of environments associated with the four development environment commandments described in this article. The issues are the following:

1. The software development industry has pursued many technology approaches for improved productivity over the past 40 years. Communications and collaboration issues cannot be resolved with the next silver bullet

- (new technology tool).
2. Management culture changes slowly, if at all. (We learn from experience that we do not learn from experience.)
3. Most managers are not brave enough to keep their hands off, to accept that a major part of their business will be performed by a remote operation that they cannot interfere with. A large part of Lockheed's management resented the existence of the skunk works and its success.
4. Low team-staffing levels and efficient (highly productive) operations equate to low profits on traditional government contracts, which reward effort rather than results.
5. Small, highly cohesive teams having little interaction with the larger organization equates to little opportunity for raises and promotions, especially in a traditional organization that wants to reward managers based on the number of people supervised rather than on results.
6. The skunk works model, where the skunk works has considerable freedom to innovate and arrive at its own solution to the customer's problems, does not work well with customers or managers who want total control. The skunk works gives the team the power to create, communicate, and overcome challenges without micro-management. There are management ideas to help enable the team communication and the project to succeed. Management style is inherently important in this promotion of team development by enhancing communication. The following summarizes this:
 1. Management cannot be a bottleneck of communication. Management must allow the team to contact the necessary people both inside and outside the team to get the needed information.
 2. Teams are not just created; they grow through communication, interaction, and trust. Management must recognize this and try to create not only membership in a team but an environment conducive to communication and interaction. After the membership and environment are in place, the trust grows. As part of the trust environment, team members need to feel that sharing information with others does not threaten their individual job status, ability to advance, or bonuses.
 3. Managers, customers, and teams need an atmosphere of trust and accountability.
 4. Management needs to view itself as support personnel that enable the team to succeed and not as the dictat-

ing, governing body.♦

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Randall Jensen, Ph.D., is a consultant for the Software Technology Support Center, Hill Air Force Base, Utah, with more than 40 years of practical experience as a computer professional in hardware and software development. For the past 30 years, he has actively engaged in software engineering methods, tools, quality software management methods, software schedule and cost estimation, and management metrics. Jensen retired as chief scientist of the Software Engineering Division of Hughes Aircraft Company's Ground Systems Group. He founded Software Engineering, Inc., a software management-consulting firm in 1980. He developed the model that underlies the SAGE and the Galorath Associates, Inc.'s SEER-SEM. He received the International Society of Parametric Analysts Freiman Award for Outstanding Contributions to Parametric Estimating in 1984. He has a doctorate in electrical engineering from Utah State University.



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Who's on Project Management?

Writing on the eve of the World Series, what better way to spur thought on communication than to have Abbott and Costello throw out the first pitch?

Costello: Abbott, if we are going to develop quality software, we need to know the development team.

Abbott: We certainly do. Who is the project manager, What is the designer, I Don't Know is the programmer...

Costello: That is what I want to find out.

Abbott: Yes, Who is the project manager, What is the designer, I Don't Know is the programmer...

Costello: They are our development team and you don't know their names?

Abbott: Well I should.

Costello: Well then, who is the project manager?

Abbott: Yes.

Costello: The project manager's name?

Abbott: Who.

Costello: The woman managing...

Abbott: Who is managing the project!

Costello: I'm asking you, who is managing the project?

Abbott: That's the woman's name.

Costello: That's whose name?

Abbott: Yes.

Costello: All I'm trying to find out is what the woman's name is managing the project.

Abbott: No, What is the designer.

Costello: I'm not asking about design.

Abbott: Well, don't change the team.

Costello: I'm not changing anybody! I am only asking you, who is the woman managing the project?

Abbott: That's right.

Costello: What's the woman's name managing the project?

Abbott: No, What is the designer.

Costello: I'm not asking you who is designing the software.

Abbott: Who is managing the project.

Costello: I don't know.

Abbott: He's the programmer.

Costello: Now how did we get on the programmer?

Abbott: You mentioned his name.

Costello: If I mentioned his name, who did I say is programming?

Abbott: No, Who's managing the project.

Costello: What's managing the project?

Abbott: What's designing software.

Costello: I don't know.

Abbott: He's programming.

Costello: Look, do you have an SEPG?

Abbott: Sure.

Costello: The SEPG Leader's name?

Abbott: Why.

Costello: I just thought I'd ask.

Abbott: Well, I just thought I'd tell.

Costello: Then tell me who leads the SEPG.

Abbott: Who's managing the project; she can't do both.

Costello: Stay out of management! I want to know what's the person's name leading the SEPG?

Abbott: No, What is designing software.

Costello: I'm not asking you who's designing the software.

Abbott: Who's managing the project!

Costello: I don't know.

Together: Programming!

Costello: Look, do you have a configuration manager on this team?

Abbott: Sure.

Costello: The configuration manager's name?

Abbott: Tomorrow.

Costello: You won't tell me today?

Abbott: I'm telling you now.

Costello: Then go ahead.

Abbott: Tomorrow!

Costello: What time tomorrow are you telling me who's managing the software configuration?

Abbott: Who is not managing the software configuration. She is managing the project.

Costello: I'll break your arm if you say who's managing the project one more time! I want to know what's the configuration manager's name?

Abbott: What's designing software.

Costello: I don't know.

Together: Programming!

Costello: Do you have a customer rep?

Abbott: Certainly.

Costello: The rep's name?

Abbott: Today.

Costello: So an ornery customer throws a curveball requirement at me. I pick up the requirement and take it to who?

Abbott: Now that's the first thing you've said right.

Costello: I don't even know what I said!

Costello: I take the requirement to Who. Who picks up the requirement and gives it to What. What gives design requirements to I Don't Know. I Don't Know notifies Tomorrow of the change. Another customer gets up and gives Today a requirement. Why? I don't know! He's programming and I don't give a darn!

Abbott: Oh, that's our test engineer.

Developing software can be complicated but you can't get to first base without good communication.

Who's your Project Manager? I hope it's not I Don't Know or I Don't Give a Darn.

— Gary A. Petersen

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